ORDER NO. MAC9812043C2

Service Manual

Room Air Conditioners

CS-G93KE / CU-G93KE
CS-G123KE / CU-G123KE

Contents

Panasonic

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

⚠ PRECAUTION OF LOW TEMPERATURE

In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

Features

• Product

– Powerful Mode for quick cool/heat
– Compressor operating frequency control to maintain desired room temperature
– Automatic Restart after power failure
– Washable front panel
– Power Monitor Display
– Standby Control
– High COP (new compressor and indoor heat exchanger)
– Vertical and Horizontal Airflow Auto Swing
– Auto change over of Automatic Operation mode

• Serviceability

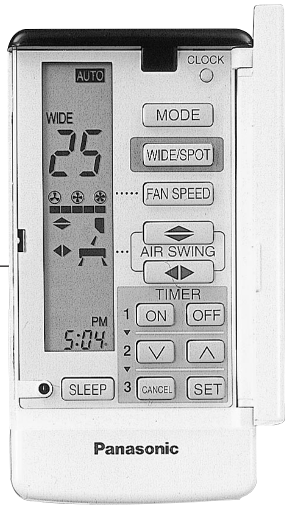
– Self diagnosis
– Test Run at both Cooling and Heating rated frequency

• Quality Improvement

– High power supply voltage protection
– Low power supply voltage protection
– Gas leakage detection

Functions

Remote Control



OFF / ON

Operation OFF / ON

MODE

Operation Mode Selection

- AUTO — Automatic Operation Mode
- HEAT — Heating Operation Mode
- COOL — Cooling Operation Mode
- DRY — Soft Dry Operation Mode
- FAN — Fan Operation Mode

POWERFUL

Powerful Mode Operation

FAN SPEED

Indoor Fan Speed Selection

- ▮ Low
- ▮▮ Medium⁻
- ▮▮▮ Medium
- ▮▮▮▮ Medium⁺
- ▮▮▮▮▮ High
- AUTO FAN — Automatic Fan Speed

AIR SWING

Airflow Direction Control

- Vertical Airflow Direction Control
  - AUTO — Automatic Control
  - Manual Control
- Horizontal Airflow Direction Control
  - AUTO — Automatic Control
  - Manual Control

TEMP

Room Temperature Setting

- Temperature Setting (16˚C to 30˚C).

TIMER ON OFF

Timer Operation Selection

- 24-hour, OFF / ON Real Timer Setting.

∨ ∧

Time / Timer Setting

- Hours and minutes setting.

SET CANCEL

Timer Operation Set / Cancel

- ON Timer and OFF Timer setting and cancellation.

CLOCK

Clock Setting

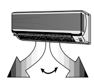
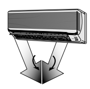
- Current time setting.

SLEEP

Sleep Mode Operation OFF / ON

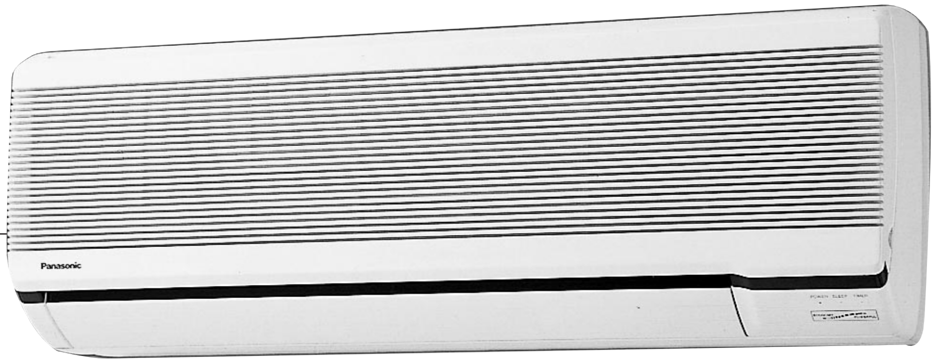
WIDE/ SPOT

WIDE / SPOT

-  WIDE Horizontal Airflow Direction
-  SPOT Horizontal Airflow Direction

Functions

Indoor Unit



FOR ALL OPERATIONS

POWER ⓘ

Power Switch OFF / ON ⓘ

AUTO
OFF / ON

Automatic Operation Switch

- Used when the remote control cannot be used.

Remote Control Signal Receiving Sound Control OFF/ON ※

- It can be controlled by pressing Automatic Operation Switch for 10 seconds.

TEST RUN
OFF / ON

Test Run Operation

- Used when test running or servicing.
- Compressor operation: rated frequency
  Cooling: 50Hz (CS-G93KE), 70Hz (CS-G123KE)
  Heating: 71Hz (CS-G93KE), 90Hz (CS-G123KE)

Operation Indication Lamps

- POWER (Red) – Lights up in operation, blinks in Automatic Operation judging and Hot Start operation.
- TIMER (Orange) – Lights up in Timer Setting. Blinks in Self Diagnosis Control.
- SLEEP (Orange) – Lights up in Sleep Mode Operation.
- POWERFUL (Orange) – Lights up when Powerful mode is selected

Power Monitor Display ※

- Lights up during compressor operation.

Operation Mode

- Automatic, Heating, Cooling, Soft Dry and Fan Operation.

Automatic Restart Control ※

- Operation is restarted after power failure at previous setting mode.

Sleep Operation Mode ※

Timer Operation ※

Powerful Mode ※

- For quick cooling or heating

Indoor Fan Speed Control ※

Airflow Direction Control ※

Functions

Room Temperature Control ※

Operation Mode	Compressor Operation Frequency	
	CS-G93KE	CS-G123KE
Cooling	15 – 64 Hz	15 – 92 Hz
Soft Dry	15 – 22 Hz	15 – 22 Hz
Heating	15 – 99 Hz	15 – 115 Hz

- **Temperature Shift ※**
- **Self Diagnosis ※**
- **Low Pressure Control ※ (Gas Leakage Detection)**
- **Low/High Power Supply Voltage Protection ※**
- **Indoor Power Relay Control ※**

COOLING/SOFT DRY OPERATION

- **Deodorizing Control ※**
- **Sensible Heat Control ※**
- **Anti-Fog Discharge Control ※**
- **Anti-Dew Formation Control ※**
- **Anti-Freezing Control ※**
- **Quiet Operation ※**

Functions

HEATING OPERATION

- **Anti-Cold Draft Control ※**
- **Hot Start ※**
- **Intake Air Temperature Control ※**
- **High Pressure Control ※**
- **Standby Control ※**
- **Deice Operation ※**

AUTOMATIC OPERATION

FAN OPERATION

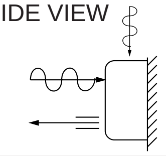
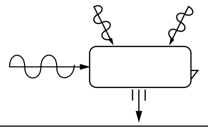
Functions

Outdoor Unit

- **Outdoor Fan Motor**
  - 6 poles induction motor, 1 speed.
- **Time Delay Safety Control ※**
- **Forced Operation 30 seconds ※**
- **High Pressure Control ※ (For Cooling/Soft Dry)**
- **DC Peak ※**
- **Total Running Current Control ※**
- **Compressor Overheating Protection ※**
- **IPM (Power Transistor) Overheating Protection ※**
- **Low Frequency Operation Protection ※**
- **Minimum Frequency Operation Protection ※**
- **Outdoor Air Temperature Control ※**
  - Detect outdoor ambient temperature and limits compressor operating frequency
- **Standby Control ※**
- **Deice Operation ※**

※ Details can be refered to OPERATION DETAIL in this manual.

Product Specifications

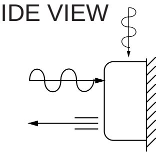
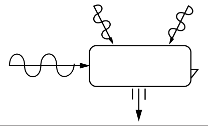
		Unit	CS-G93KE	CU-G93KE
Cooling Capacity		kW Btu/h	2.6 (0.70 - 3.00) 8,800 (2,300 - 10,200)	
Heating Capacity		kW Btu/h	3.6 (0.63 - 5.00) 12,200 (2,100 - 17,000)	
Moisture Removal		ℓ/h Pint/h	1.6 3.4	
Power Source		Phase V Cycle	Single 230 50	
Airflow Method		OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 7.0 (250) Heating ; 7.6 (270)	–
	Indoor Air (Me)	m³/min (cfm)	Cooling ; 8.8 (310) Heating ; 9.4 (330)	–
	Indoor Air (Hi)	m³/min (cfm)	Cooling ; 10.0 (350) Heating ; 10.8 (380)	–
	Outdoor Air	m³/min (cfm)	–	34.1 (1200)
Noise Level		dB (A)	Cooling ; High 38, Low 30 Heating ; High 39, Low 30	Cooling ; 46 Heating ; 47
Electrical Data	Input	kW	Cooling ; 0.73 (0.21 - 0.99) Heating ; 0.99 (0.20 - 1.40)	
	Running Current	A	Cooling ; 3.75 (max. 6.76) Heating ; 4.80 (max. 6.76)	
	COP	W/W	Cooling ; 3.56 Heating ; 3.64	
	Starting Current	A	4.80	
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 3/8" L ; Half Union 1/4"	G ; 3-way valve 3/8" L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch inch	G (gas side) ; 3/8" L (liquid side) ; 1/4"	G (gas side) ; 3/8" L (liquid side) ; 1/4"
Drain Hose	Inner diameter	mm	12	–
	Length	m	0.7	–
Power Cord Length			2.1 m	–
Number of core-wire			3 core wires × 1.0 mm²	–
Dimensions	Height	inch (mm)	10-31/32 (279)	21-9/32 (540)
	Width	inch (mm)	31-15/32 (799)	27-17/32 (699)
	Depth	inch (mm)	7-15/32 (190)	11-7/32 (285)
Net Weight		lb (kg)	20 (9.0)	86 (39)
Compressor	Type		–	Rotary (2 cylinders) rolling piston type
	Motor Type		–	Induction (4-poles)
	Rated Output	W	–	500
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Material		AS + Glass Fiber 30%	P.P + (Mica + Glass Fiber) 30%
	Motor Type		Transistor (4-poles)	Induction (6-poles)
	Input	W	–	64
	Rated Output	W	20	20
	Fan Speed Lo (Cool/Heat)	rpm	980/1,010	–
	Me (Cool/Heat)	rpm	1,160/1,220	–
	Hi (Cool/Heat)	rpm	1,280/1,380	760

Product Specifications

		Unit	CS-G93KE	CU-G93KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slit Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2/14	1/20
	FPI		21	19
	Size (W × H × L)	mm	614 × 294 × 25.4	782.9 × 508 × 22
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (350)
Refrigerant (R-22)		g (oz)	–	780 (27.5)
Thermostat			Electronic Control	–
Protection Device			Electronic Control	Electronic Control
Capillary Tube	Length Flow Rate Inner Diameter	mm ℓ/min mm	– – –	C1,C2 ; 1033, C3 ; 400 C1,C2 ; 4.8, C3 ; 23.6 C1,C2 ; 1.2, C3 ; 1.8
Air Filter	Material Style		P.P. Honeycomb	–
Fan Motor Capacitor		μF, VAC	–	2.0 μF, 400 VAC

• Specifications are subject to change without notice for further improvement.

Product Specifications

		Unit	CS-G123KE	CU-G123KE
Cooling Capacity		kW Btu/h	3.45 (0.74 - 4.00) 11,700 (2,500 - 13,600)	
Heating Capacity		kW Btu/h	4.80 (0.70 - 6.50) 16,300 (2,300 - 22,100)	
Moisture Removal		ℓ/h Pint/h	2.0 4.2	
Power Source		Phase V Cycle	Single 230 50	
Airflow Method		OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 9.0 (320) Heating ; 9.0 (320)	–
	Indoor Air (Me)	m³/min (cfm)	Cooling ; 10.4 (370) Heating ; 10.4 (370)	–
	Indoor Air (Hi)	m³/min (cfm)	Cooling ; 11.2 (400) Heating ; 11.6 (410)	–
	Outdoor Air	m³/min (cfm)	–	31.5 (1110)
Noise Level		dB (A)	Cooling ; High 41, Low 35 Heating ; High 41, Low 35	Cooling ; 48 Heating ; 50
Electrical Data	Input	kW	Cooling ; 1.05 (0.22 - 1.33) Heating ; 1.41 (0.22 - 2.00)	
	Running Current	A	Cooling ; 5.00 (max. 8.96) Heating ; 6.30 (max. 8.96)	
	COP	W/W	Cooling ; 3.29 Heating ; 3.40	
	Starting Current	A	6.3	
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 1/2" L ; Half Union 1/4"	G ; 3-way valve 1/2" L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch inch	G (gas side) ; 1/2" L (liquid side) ; 1/4"	G (gas side) ; 1/2" L (liquid side) ; 1/4"
Drain Hose	Inner diameter	mm	12	–
	Length	m	0.7	–
Power Cord Length			2.1 m	–
Number of core-wire			3 core wires × 1.5 mm²	–
Dimensions	Height	inch (mm)	10 - 31/32 (279)	21 - 9/32 (540)
	Width	inch (mm)	31-15/32 (799)	27 17/32 (699)
	Depth	inch (mm)	7 - 15/32 (190)	11 - 7/32 (285)
Net Weight		lb (kg)	20 (9.0)	95 (43.0)
Compressor	Type		–	Rotary (2 cylinders) rolling piston type
	Motor Type		–	Induction (4-poles)
	Rated Output	W	–	500
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Material		AS + Glass Fiber 30%	P.P + (Mica + Glass Fiber) 30%
	Motor Type		Transistor (4-poles)	Induction (6-poles)
	Input	W	–	67
	Rated Output	W	20	25
	Fan Speed Lo (Cool/Heat)	rpm	1,170/1,200	–
	Me (Cool/Heat)	rpm	1,320/1,360	–
	Hi (Cool/Heat)	rpm	1,410/1,480	790

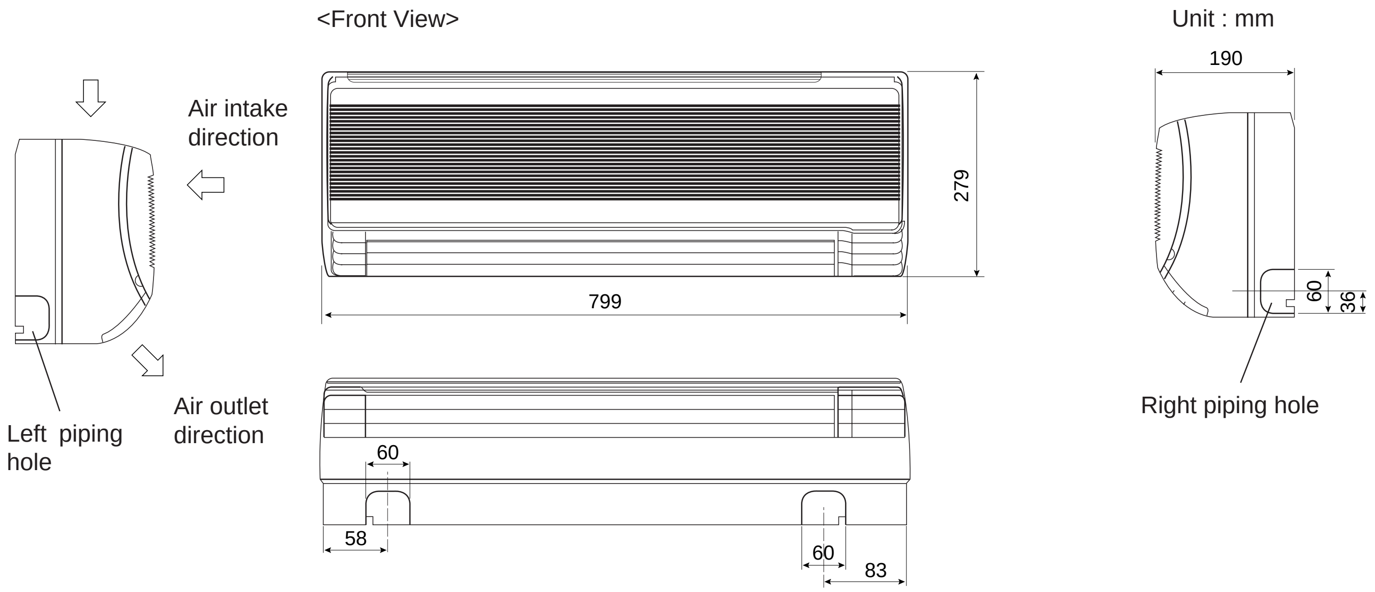
Product Specifications

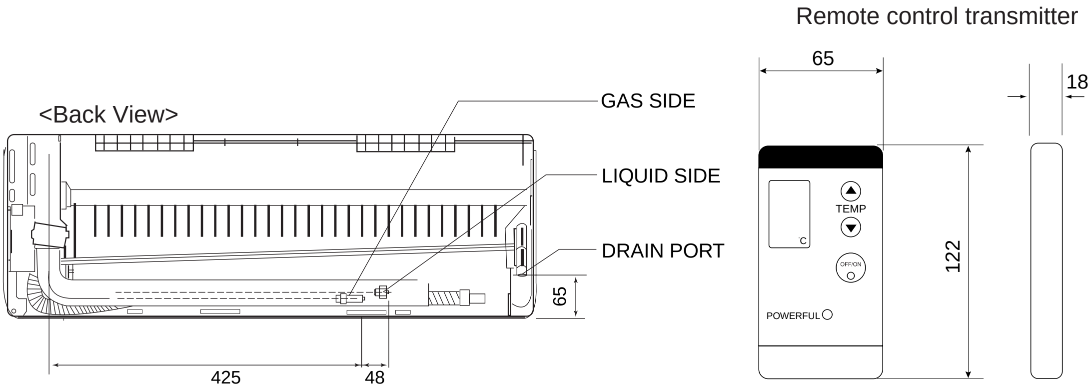
		Unit	CS-G123KE	CU-G123KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slit Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2/14	2/20
	FPI		21	16
	Size (W × H × L)	mm	614 × 294 × 25.4	693.5 × 508 × 44
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (350)
Refrigeration (R-22)		g (oz)	–	1,070 (37.8)
Thermostat			Electronic Control	–
Protection Device			Electronic Control	Electronic Control
Capillary Tube	Length	mm	–	C1,C2 ; 720, C3 ; 420
	Flow Rate	ℓ/min	–	C1, C2 ; 7.2, C3 ; 14.4
	Inner Diameter	mm	–	C1, C2 ; 1.3, C3 ; 1.5
Air Filter	Material		P.P.	–
	Style		Honeycomb	–
Fan Motor Capacitor		µF, VAC	–	2.0 µF, 400 VAC

• Specifications are subject to change without notice for further improvement.

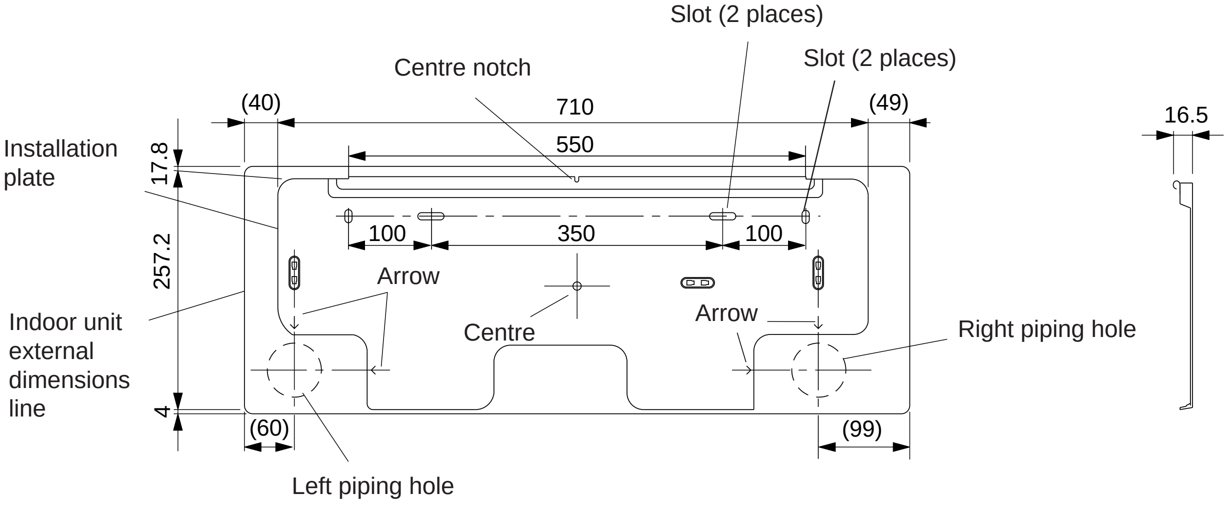
Dimensions

CS-G93KE / CS-G123KE





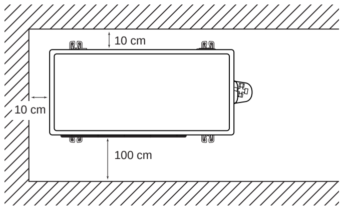
Relative position between the indoor unit and the installation plate <Front View>



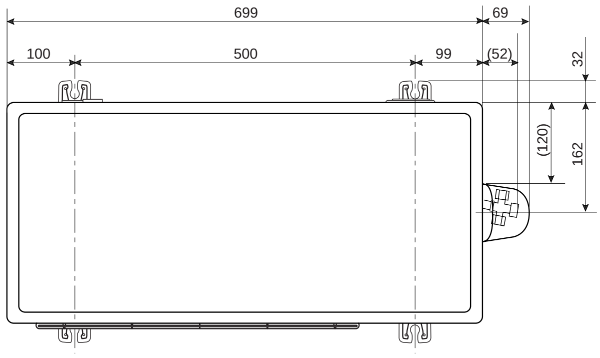
Dimensions

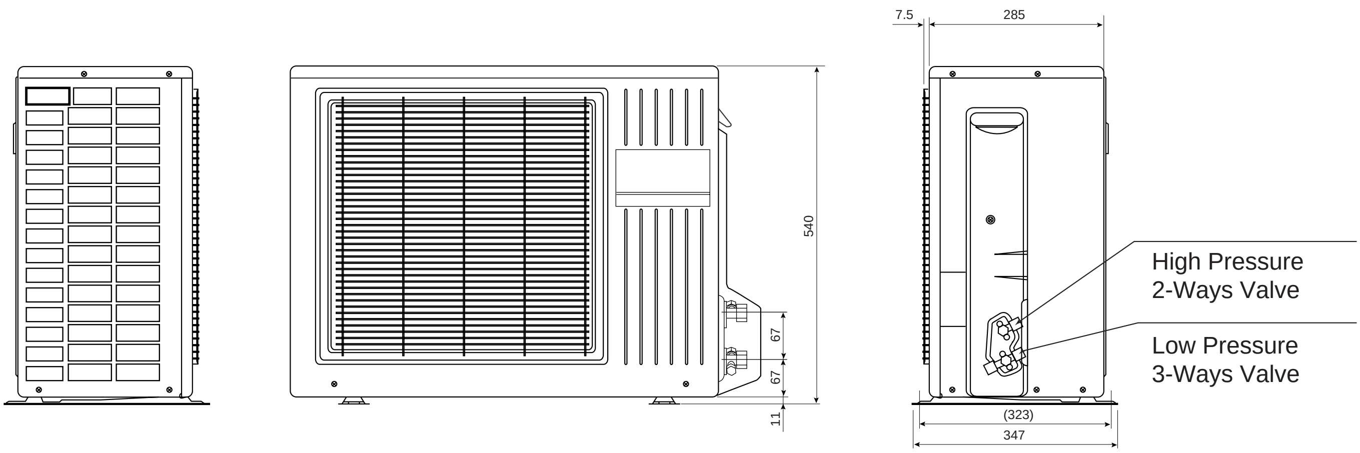
CU-G93KE / CU-G123KE

Space necessary for installation



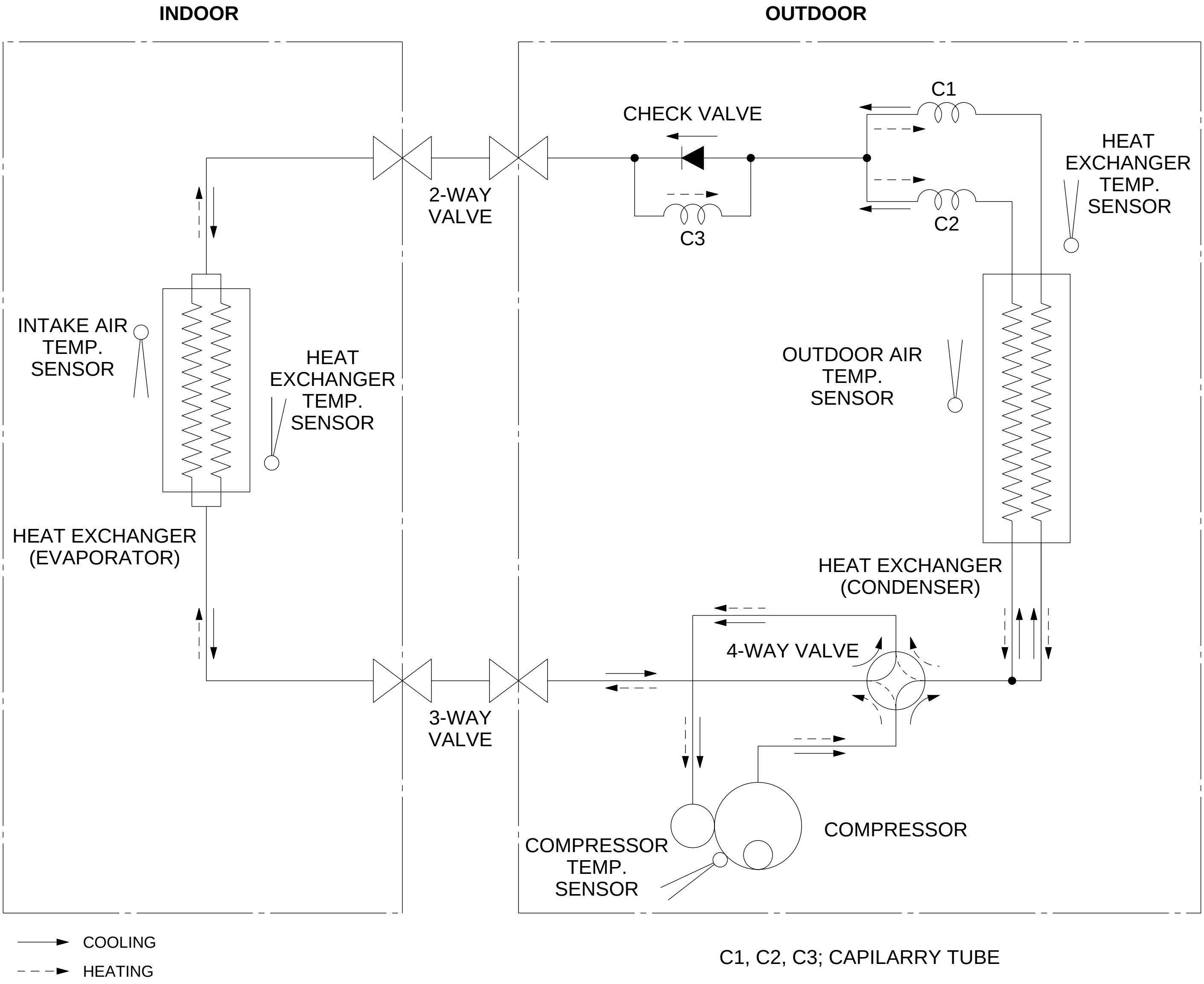
Anchor Bolt Pitch
323 x 500





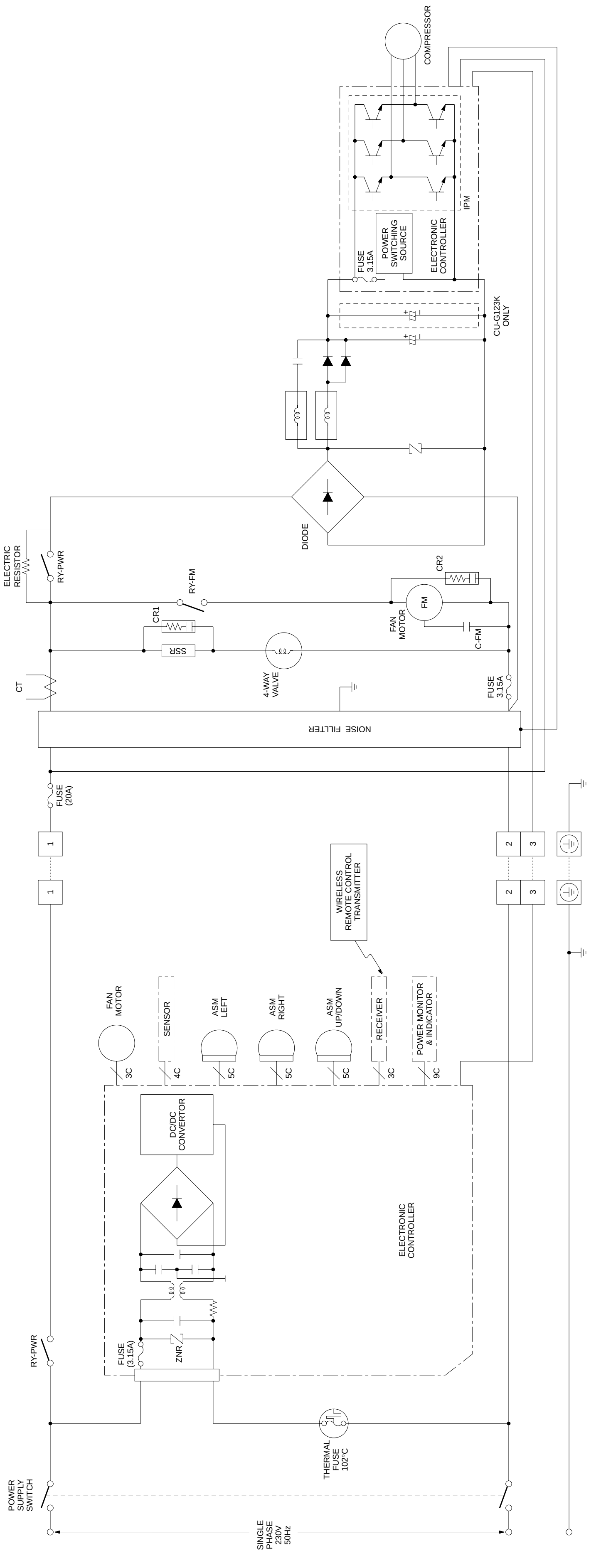
Refrigeration Cycle Diagram

CS-G93KE / CU-G93KE
CS-G123KE / CU-G123KE



Block Diagram

CS-G93KE / CU-G93KE
CS-G123KE / CU-G123KE

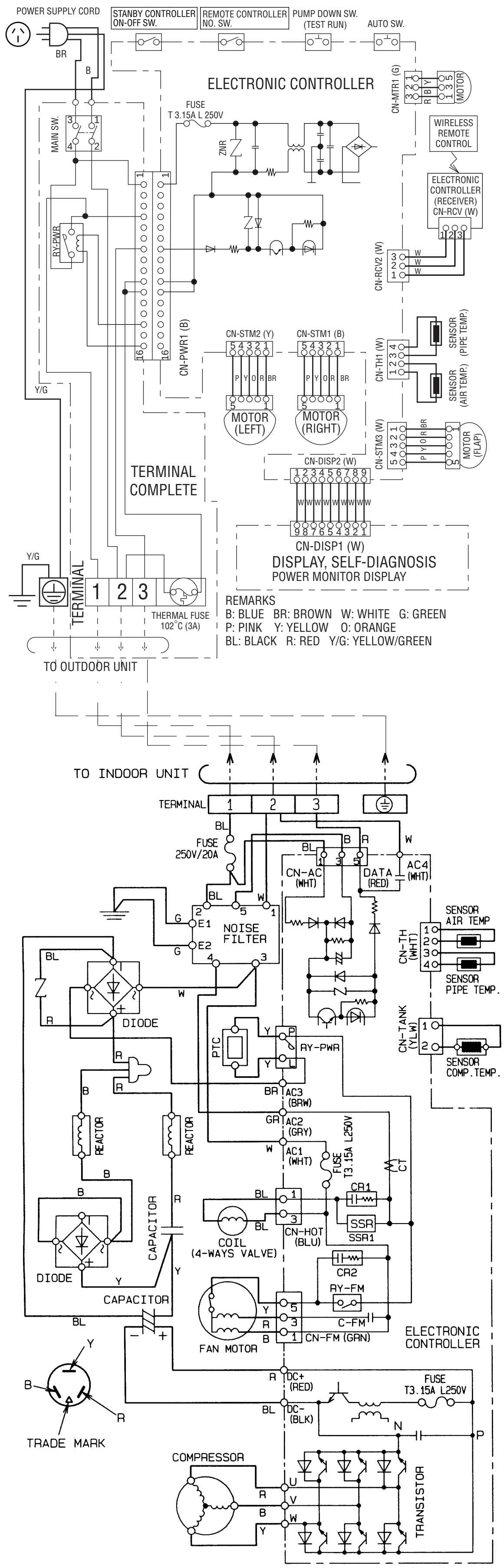


※ [dashed box] Indicates the electronic controller.

※ "C" Indicates the number of core wires.(Example: 5C=5 core wires)

Wiring Diagram

CS-G93KE / CU-G93KE



Resistance of Outdoor Fan Motor Windings

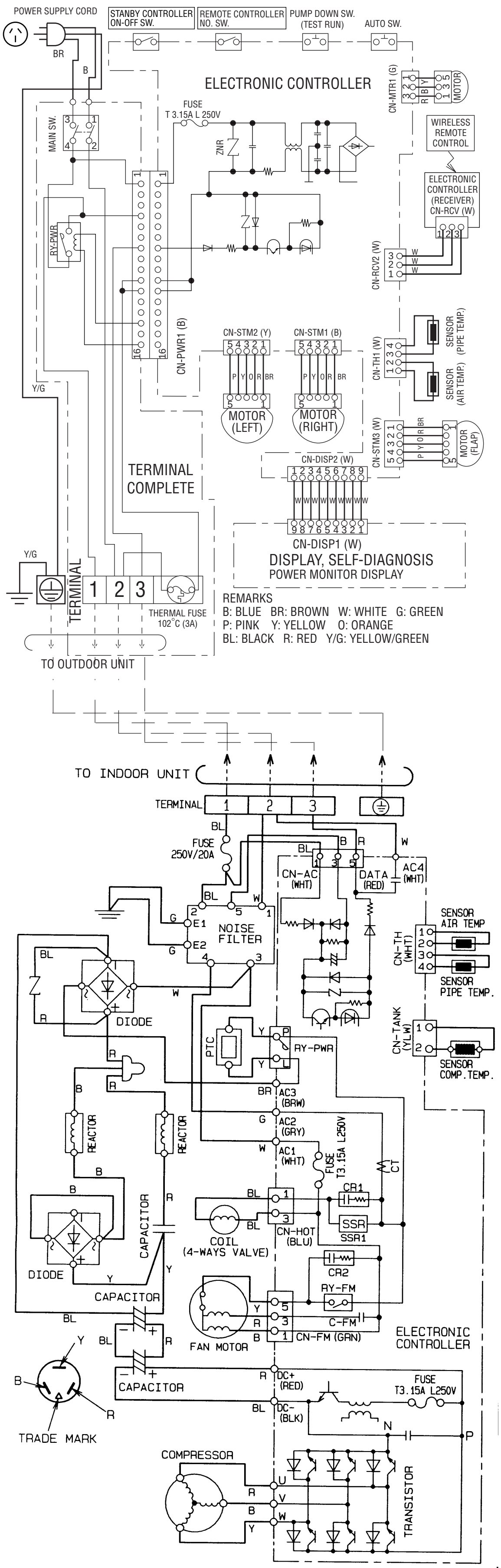
CONNECTION	CWA95384 (Ω)
BLUE - YELLOW	264.1
YELLOW - RED	304.8

Resistance of Compressor Windings

CONNECTION	2RD132X5BB03(Ω)
U-V	0.8
U-W	0.8
V-W	0.8

Wiring Diagram

CS-G123KE / CU-G123KE



Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95380 (Ω)
BLUE - YELLOW	234.1
YELLOW - RED	263.5

Resistance of Compressor Windings

CONNECTION	2RD132X5BA03 (Ω)
U-V	0.8
U-W	0.8
V-W	0.8

Operation Details

A. FUNCTIONS

1. TEMPERATURE SHIFT

Once the operation starts, the remote control setting temperature will be shifted internally based on the setting fan speed and outdoor air temperature. In addition, if Sleep Mode or Powerful Mode are set, the temperature shift will be carried out.

Setting of Internal Setting Temperature
The internal setting temperature can be decided as follows:

Remote control setting temperature
+
Outdoor temperature shift (refer Table a)
+
Fan speed shift (+ 1.0 °C)
+
Any Sleep Mode shift operation?
+
Any Powerful Operation shift? (refer Table b)
+
[Check upper/lower (33°C/16°C) limit for setting temperature]
↓
INTERNAL SETTING TEMPERATURE

Table a
Setting Temperature Shift based on outdoor air temperature.

(i) Cooling, Soft Dry

	Shift amount	
	CS-G93KE	CS-G123KE
38°C ≤ Outdoor air temperature	–1.0°C	–1.0°C
30°C ≤ Outdoor air temperature < 38°C	–0.5°C	–1.0°C
23°C ≤ Outdoor air temperature < 30°C	0.0°C	0.0°C
Outdoor air temperature < 23°C	+1.0°C	+1.0°C

(ii) Heating

	Shift amount
21°C ≤ Outdoor air temperature	–1.5°C
17°C ≤ Outdoor air temperature < 21°C	–1.0°C
13°C ≤ Outdoor air temperature < 17°C	–1.0°C
9°C ≤ Outdoor air temperature < 13°C	0.0°C
5°C ≤ Outdoor air temperature < 9°C	+0.5°C
1°C ≤ Outdoor air temperature < 5°C	+1.0°C
–3°C ≤ Outdoor air temperature < 1°C	+1.0°C
Outdoor air temperature < –3°C	+1.5°C

Table b
Powerful Mode Shift.

	Cooling	Dry	Heating
Powerful	–4.0°C	–3.0°C	+6.0°C

Operation Details

2. COOLING OPERATION

A. Room Temperature Control

(i) When the remote control setting temperature is less than 24°C.

Cooling	Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	64 (Fc max) or 50	64 (Fc max) or 50	92 (Fc max) or 70	92 (Fc max) or 70
+1.5 ~ +1.0	36	40	44	49
+1.0 ~ +0.5	31	31	31	31
+0.5 ~ 0 (Internal setting temp.)	15	22	16	22
0 ~ –0.5	15	15	15	16
–0.5 ~ –1.0 (Compressor OFF temp.)	15	15	15	15
below –1.0	Comp OFF	Comp OFF	Comp OFF	Comp OFF
Outdoor Air Temperature	Less than 38°C	38°C and above	Less than 38°C	38°C and above
Model No.	CS-G93KE		CS-G123KE	

(ii) When the remote control setting temperature is 24°C and above.

Cooling	Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	64 (Fc max) or 50	64 (Fc max) or 50	92 (Fc max) or 70	92 (Fc max) or 70
+1.5 ~ +1.0	36	36	44	44
+1.0 ~ +0.5	31	31	31	31
+0.5 ~ 0 (Internal setting temp.)	15	15	16	16
0 ~ –0.5	15	15	15	15
–0.5 ~ –1.0 (Compressor OFF temp.)	15	15	15	15
below –1.0	Comp OFF	Comp OFF	Comp OFF	Comp OFF
Outdoor Air Temperature	Less than 38°C	38°C and above	Less than 38°C	38°C and above
Model No.	CS-G93KE		CS-G123KE	

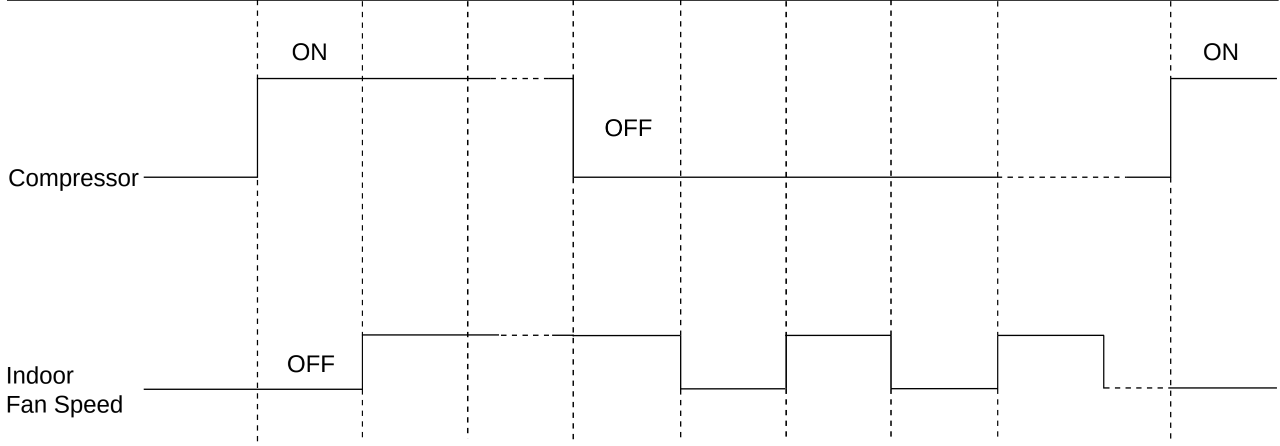
- Compressor OFF temperature = Compressor ON temperature.
- The operation frequency can be changed every 30 seconds.
- 30 minutes from the start of the operation, the compressor is operating at Fc max Hz.
- The compressor stops when the intake air temperature reaches 1°C below internal setting temperature and continues for 3 minutes.
- When the compressor stops, it will not begin operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature reaches the Compressor ON temperature, the Compressor starts operation.
- When the compressor stops, the outdoor fan motor stops 30 seconds later.

Operation Details

B. Deodorizing Control

- This control is available during automatic fan speed for Cooling and Soft Dry Operation. It is not available during anti-freezing control.

Deodorizing Status	1	2	3	4	5	6	7	6, 7, 6, 7,…	1
Compressor	ON			OFF					ON
Time (second)	40	50		30	60	30	60	………	40
Indoor Fan Speed	OFF	SLo	Auto	SLo	OFF	SLo	OFF	………	OFF



- When the compressor is in operation, the deodorizing status starts from 1 → 2 → 3.
- When the compressor stops operation, the deodorizing status starts from 4 → 5 → 6 → 7.
- If the compressor still stops operation after 3 minutes, the deodorizing status will start from 6.

C. Sensible Heat Control

- This control is to improve the feeling in high fan speed during low operation frequency. When the operation frequency is less than 33Hz (CU-G93KE) or 36Hz (CU-G123KE), the fan speed will reduce. When the operation frequency is increased to 40Hz (CU-G93KE) or 49Hz (CU-G123KE) continuously for 5 minutes, the fan speed will resume to normal condition.

Operation Details

3. SOFT DRY OPERATION

A. Room Temperature Control

At the start of operation, cooling operation is running until the intake air temperature is 0.5°C higher than internal setting temperature, then the operation will shift to Soft Dry with indoor fan speed SLo.

Soft Dry	Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	Cooling Operation		Cooling Operation	
+1.5 to +1.0		22		22
+1.0 to +0.5		22		22
+0.5 to 0 (Internal setting temp.)	15	15	16	16
0 to –0.5	15	15	15	15
–0.5 to –3.5	15	15	15	15
Compressor OFF temp. –3.5	Comp OFF	Comp OFF	Comp OFF	Comp OFF
Condition	When the temperature falls	When the temperature rises	When the temperature falls	When the temperature rises
Model No.	CS-G93KE		CS-G123KE	

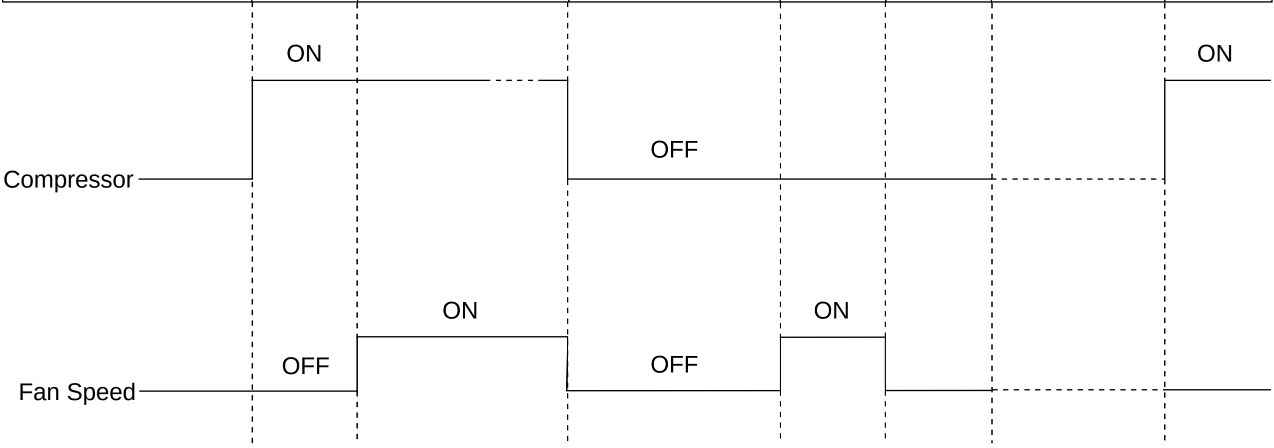
- Compressor OFF temperature = Compressor ON temperature.
- The operation frequency changes every 30 seconds.
- 30 minutes from the start of the operation, the compressor is operating at Fc max Hz.
- The Compressor stops when the intake air temperature reaches 3.5°C below internal setting temperature and continues for 3 minutes.
- When the compressor stops operation, indoor fan stops for 330 seconds.
- When the Compressor stops, it will not begin operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature reaches the Compressor ON temperature, the Compressor starts operation immediately.
- When the Compressor stops, the outdoor fan motor stops 30 seconds later.

Operation Details

B. Deodorizing Control

- This control is available during automatic fan speed for Cooling and Soft Dry Operation. It is not available during anti-freezing control.

Deodorizing Status	1	2	3	4	5	4, 5, 4, 5,…	1
Compressor	← ON →		← OFF →				ON
Time (second)	40		330	30	60	………	40
Fan Speed	OFF	SLo	OFF	SLo	OFF	………	OFF



- When the compressor is in operation, the deodorizing status starts from 1 → 2.
- When the compressor stops operation, the deodorizing status starts from 3 → 4 → 5.
- When the compressor stops operation, indoor fan stops for 330 seconds.

C. Sensible Heat Control

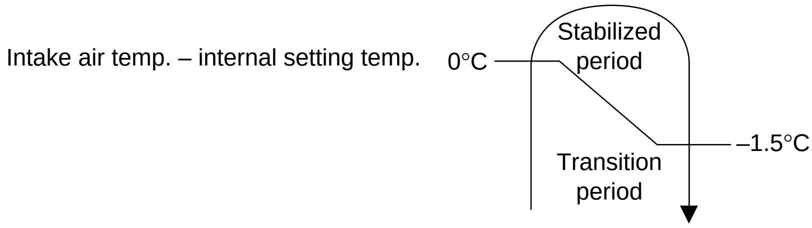
- This control is to improve the feeling in high fan speed and low operation frequency. When the operation frequency is less than 33Hz (CU-G93KE) or 36Hz (CU-G123KE), the fan speed will reduce. When the operation frequency is increased to 40Hz (CU-G93KE) or 49Hz (CU-G123KE) continuously for 5 minutes, the fan speed will resume to normal condition. (During Cooling operation).

Operation Details

4. HEATING OPERATION

A. Room Temperature Control

- During heating operation, the room temperature control depends on intake air temperature and internal setting temperature. Basically it can be divided into 2 periods as shown below:



(i) When indoor fan speed is Medium or above.

CS-G93KE

Heating Operation		Compressor Operation Frequency (Hz)				
		Transition Period	Stabilized Period			
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5					
		15	15	15	15	15
	+1.0					
		15	15	15	26	15
	+0.5					
		22	22	22	33	22
Internal setting temp.	0					
		46	26	26	36	26
	–0.5					
		53	33	33	46	33
	–1.0					
		64	36	36	53	36
	–1.5					
		71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

Operation Details

CS-G123KE

Heating Operation		Compressor Operation Frequency (Hz)				
		Transition Period	Stabilized Period			
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5					
	+1.5 ~ +1.0	16	16	16	16	16
	+1.0 ~ +0.5	16	16	16	27	16
	+0.5 ~ 0	22	22	22	36	22
Internal setting temp.	0 ~ –0.5	64	27	27	44	27
	–0.5 ~ –1.0	74	36	36	64	36
	–1.0 ~ –1.5	86	44	44	74	44
	below –1.5	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

(ii) When indoor fan speed is lower than Medium

CS-G93KE

Heating Operation		Compressor Operation Frequency (Hz)				
		Transition Period	Stabilized Period			
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5					
	+1.5 ~ +1.0	15	15	15	15	15
	+1.0 ~ +0.5	15	22	22	26	22
	+0.5 ~ 0	22	26	26	33	26
Internal setting temp.	0 ~ –0.5	46	33	33	36	33
	–0.5 ~ –1.0	53	36	36	46	36
	–1.0 ~ –1.5	64	46	46	53	46
	below –1.5	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)	71 (Fh) or 99 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

Operation Details

CS-G123KE

Heating Operation		Compressor Operation Frequency (Hz)				
		Transition Period	Stabilized Period			
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5					
		16	16	16	16	16
	+1.0					
		16	22	22	27	22
	+0.5					
		22	27	27	36	27
Internal setting temp.	0					
		64	36	36	44	36
	–0.5					
		74	44	44	64	44
	–1.0					
		86	64	64	74	64
	–1.5					
		90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)	90 (Fh) or 115 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

- Compressor OFF temperature = compressor ON temperature.
- The operation frequency changes every 30 seconds.
- When the difference of the intake air temperature and Internal setting temperature is –1.5°C or more, compressor will operate at Fh continuously for 3 minutes and then change over to Fhmax.
- The compressor stops when the intake air temperature reaches 1.5°C above internal setting temperature and continues for 3 minutes.
- When the compressor stops, it will not start operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature decreases to the compressor ON temperature, the compressor starts immediately.
- When the compressor stops, the outdoor fan motor stops 30 seconds later.

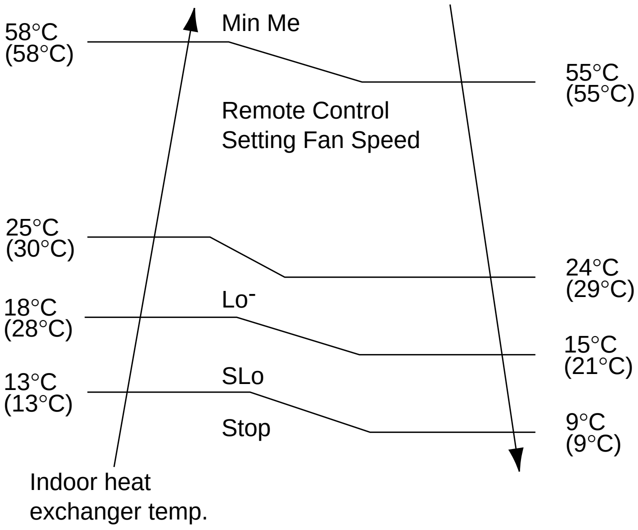
Operation Details

B. Anti Cold Draft Control

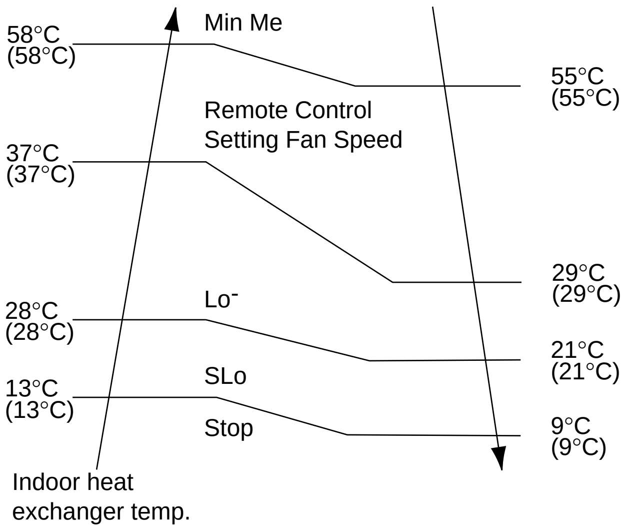
(i) Indoor Fan Control
Indoor fan speed and airflow direction varies in accordance to the indoor heat exchanger temperature as shown below:

a. Manual Fan speed control

(Auto Airflow Direction Control)

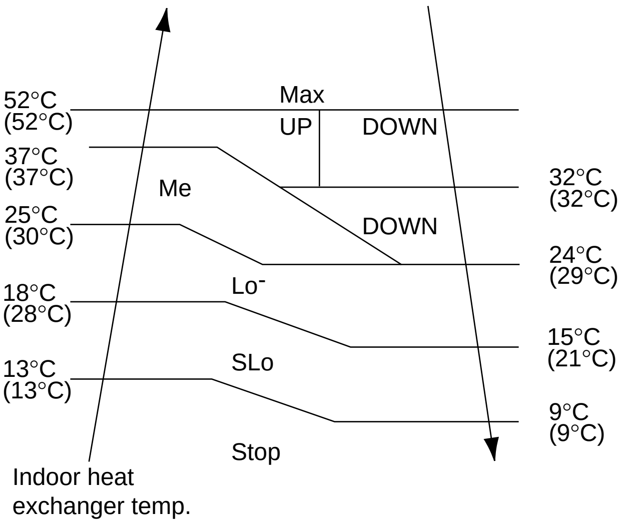


(Manual Airflow Direction Control)

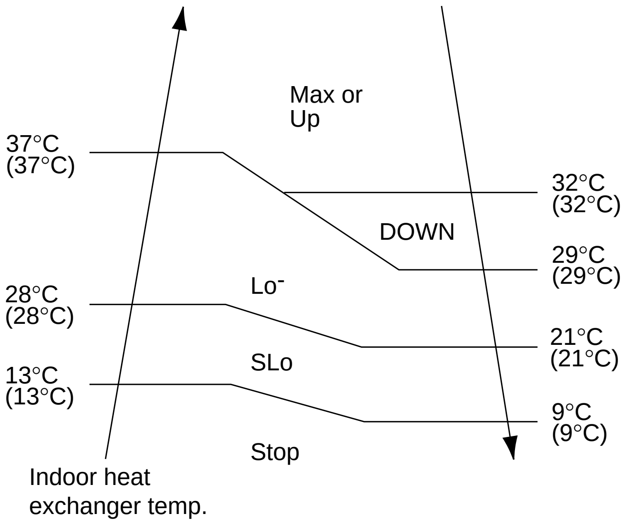


b. Auto Fan Speed Control

(Auto Airflow Direction Control)



(Manual Airflow Direction Control)



Note:
- UP means fan speed is increased by 1 rank.
- DOWN means fan speed is decreased by 1 rank.
- Max means fan speed is running at maximum auto fan speed.
- Temperature in ( ) is indicating when powerful mode is selected.

Operation Details

(ii) Hot Start

- At the start of heating operation, the indoor fan stops and compressor operates at Fhmax frequency 99Hz (CS-G93KE) or 115 Hz (CS-G123KE). This is to heat up the indoor heat exchanger in order to avoid cold air discharged.
- Hot Start ends when

  a. Indoor heat exchanger temperature reaches over 15°C

  or

  b. 4 minutes after heating operation starts.

- After Hot Start operation, compressor operates at Fhmax 99Hz(CS-G93KE) or 115Hz (CS-G123KE) for 2 minutes.

(iii) Vertical and Horizontal Airflow Direction Control

- Vertical and horizontal airflow direction control is in accordance to indoor heat exchanger temperature. This control is valid for automatic airflow direction only.

C. Deice Operation

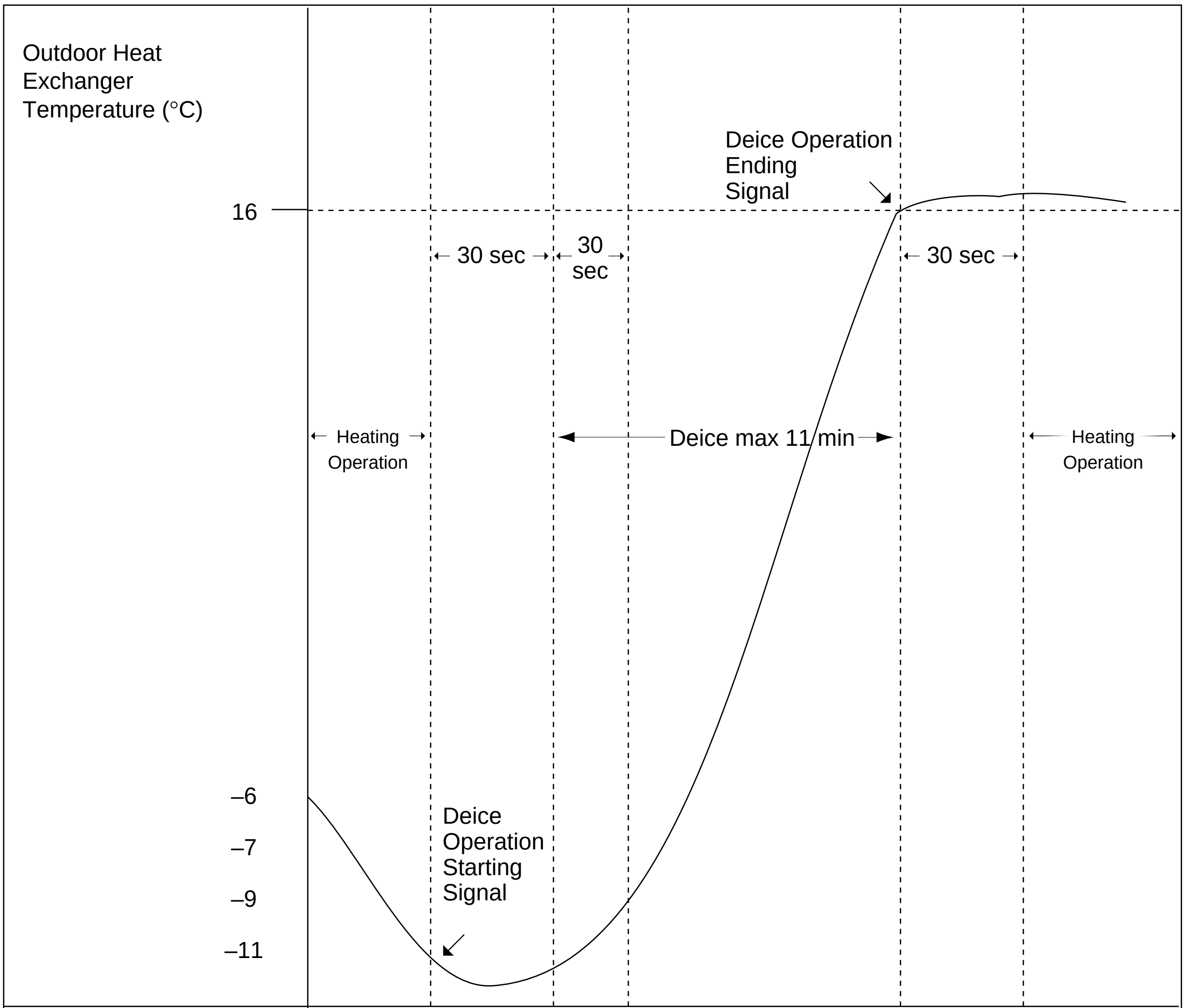
Deice operation occurs when the deice operation starting signal is generated. This happens when one of the following conditions occurs. However, the first deice operation will begin 1 hour after start of heating operation.

	Outdoor Heat Exchanger Temp. Th < 3°C	Outdoor Heat Exchanger Temp. (Th)	Outdoor Temp. (To)
Case 1	120 minutes continuously	Th < -6°C for 3 min continuously	To > –1°C
Case 2	80 minutes continuously	Th < -7°C for 3 min continuously	To > –1°C
Case 3	40 minutes continuously	Th < -9°C for 3 min continuously	To ≥ –3°C
Case 4	40 minutes continuously	Th < -11°C for 3 min continuously	To < –3°C

Note: The above 4 cases are under compressor operating condition.

Operation Details

Deice Operation Time Chart



Compressor operating frequency	Free	40Hz (CU-G93KE) 49Hz (CU-G123KE)		58Hz (CU-G93KE) 83Hz (CU-G123KE)	OFF	99Hz (CU-G93KE) 115Hz (CU-G123KE)
Indoor Fan	ON	ON	OFF	OFF	OFF	Hot Start
Outdoor Fan	ON	ON	OFF	OFF	OFF	ON
4-way valve	ON	ON	OFF	OFF	OFF	ON

- Compressor frequency is set at 40Hz (CU-G93KE) or 49Hz (CU-G123KE) when the deice operation starting signal is generated.
- 30 seconds later deice operation starting signal is generated, indoor fan, outdoor fan, 4-way valve are turned off and compressor operates at 40Hz (CU-G93KE) or 49Hz (CU-G123KE) for 30 seconds. (Deice operation starts)
- During deice operation, the compressor operating frequency is set at 58Hz (CU-G93KE) or 83Hz (CU-G123KE).
- Deice will end when the outdoor heat exchanger temperature rises to 16°C or after 11 minutes.

Operation Details

D. Standby Control

(a) The purpose of Standby Control is to warm up the compressor when outdoor temperature is low. The standby control will be activated when all of the followings occur.

(i) Main power switch is ON.
(ii) Unit is not operating.
(iii) Outdoor ambient temperature is below 3°C.
(iv) Compressor stops more than 3 hours.
(v) Standby switch at indoor electronic controller is ON.
(The standby switch is at ON position during product delivery from factory).

(b) When the standby control is activated, low electricity will be supplied to compressor for 1 minute and stops for 4 minutes. This condition is repeated until standby control is cancelled. It will consume about 35 W of electric power.

Electricity supplied to compressor	ON	OFF	ON	OFF	· · · · · ·
Time	1 min	4 min	1 min	4 min	· · · · · ·

(c) Standby control will be cancelled when one of the following conditions occurs.

(i) Unit starts operation.
(ii) Outdoor ambient temperature ≥ 5°C.
(iii) Compressor starts operation.
(iv) Standby switch at indoor electronic controller is switched to OFF.
(v) Protection control is activated.

(d) When the unit is switched on by the remote control, the compressor operates at frequency as shown in below:-

	Frequency			
CS-G93KE	Max. 36Hz Min. 33Hz	Max. 36Hz	Max. 71Hz	Free
CS-G123KE	Max. 44Hz Min. 36Hz	Max. 44Hz	Max. 90Hz	Free
Time (sec)	0 → 60	60 → 120	120 → 180	180 →

(e) The standby control can be cancelled by switching off the standby switch (SW2) at indoor electronic controller.

Operation Details

5. FAN OPERATION

This operation is to enable the fan operation without compressor running. Timer operation is valid for fan operation.

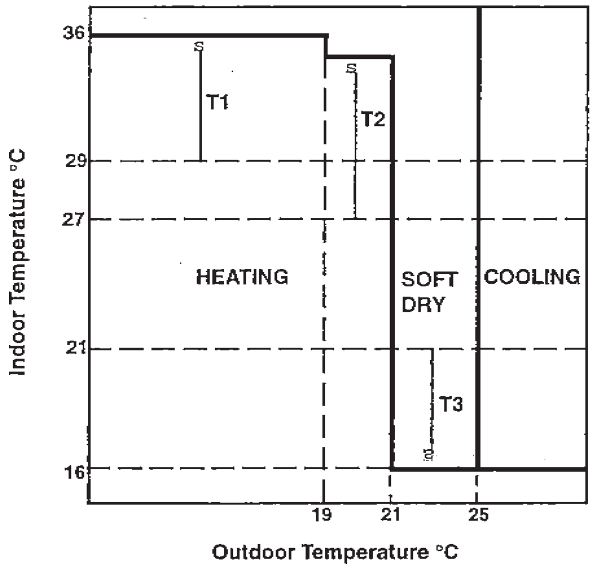
6. AUTOMATIC OPERATION

When the Automatic mode is selected, the operation mode is decided in accordance to remote control setting temperature, intake air temperature and outdoor air temperature.

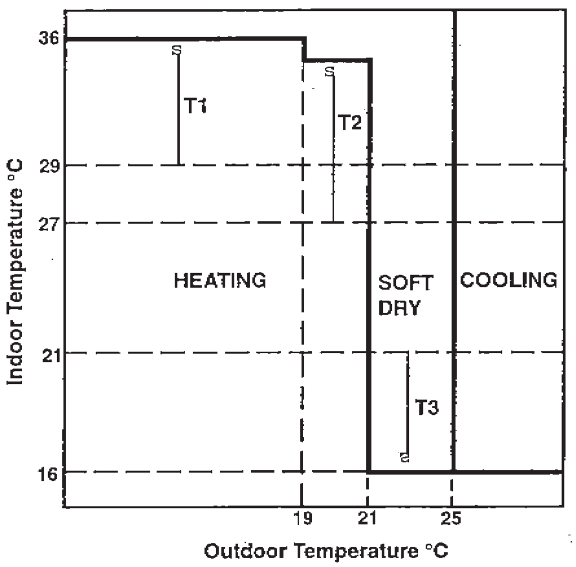
- During judging the operation mode, indoor fan is running at Lo– speed and outdoor fan at ON in order to sense the indoor intake air temperature and outdoor air temperature for 20 seconds. At this time, Power LED is blinking. After the operation mode is selected, Power LED lights up.

  Refer to the examples below, there are 4 determination charts when automatic mode is selected.

  (a) When setting temperature of remote control is 18°C and below.

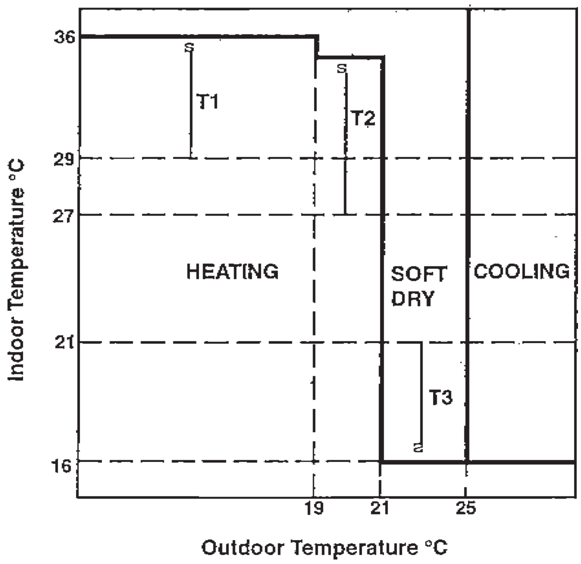


  (b) When setting temperature of remote control is 19°C ~ 22°C.

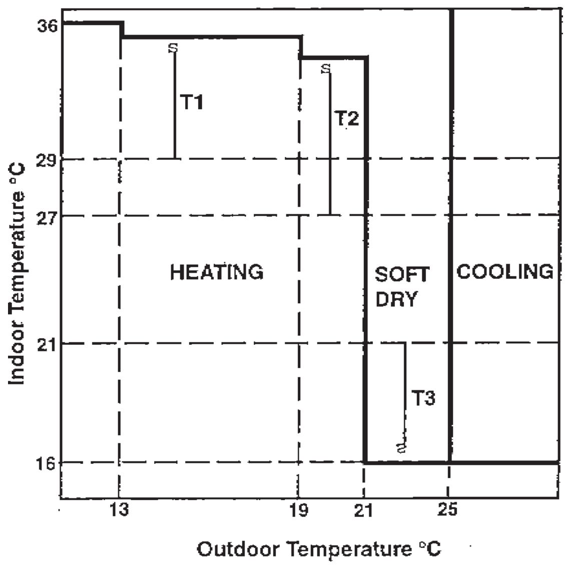


Operation Details

(c) When setting temperature of remote control is 23°C ~ 26°C.



(d) When setting temperature of remote control is 27°C and above.



Setting Temp. °C	T1	T2	T3
18 and below	+10	+8	-5
19~22	+8	+7	-7
23~26	+7	+6	-7
27 and above	+6	+5	-8

Note: Base temperature for T1 is 29° C
Base temperature for T2 is 27° C
Base temperature for T3 is 21° C

Operation Details

- When the operation mode is changed over, the value for t1, t2 and t3 are shifted as follows:
  Cooling/Soft dry → Heating: –2°C
  Heating → Cooling/Soft dry: +2°C
- When the indoor intake air temperature is lower than 16°C, heating operation is immediately started.
- When the outdoor air temperature is more than 25°C, and the intake air temperature is over 16°C, cooling operation is immediately started.
- The operation mode is judged every 30 minutes.
- When the operation mode (Heating, Cooling or Soft Dry) is decided, the internal setting temperature will shift as shown below:

Remote Control Setting temperature

\+

Outdoor temperature shift

\+

Fan speed shift

\+

Automatic mode shift

\+

Mode	Shift
Cooling	+0.75°C
Soft Dry	0°C
Heating	–0.75°C

↓

INTERNAL SETTING TEMPERATURE

Operation Details

7. INDOOR FAN SPEED CONTROL

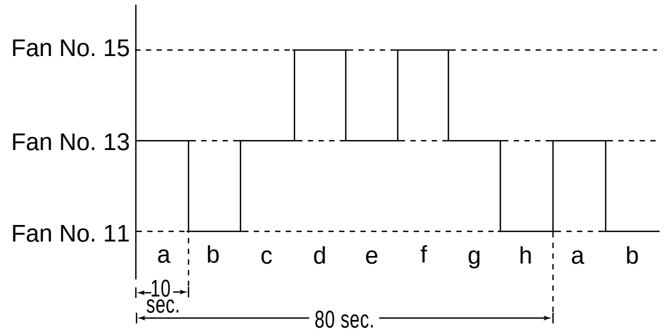
Fan Speed No.	Voltage Supply to Fan Motor DC (V) CS-G93KE	Voltage Supply to Fan Motor DC (V) CS-G123KE	Cooling Manual	Cooling Auto	Soft Dry	Remarks	Heating Manual	Heating Auto	Remarks
0			OFF	OFF	OFF		OFF	OFF	• Hot Start Control
1									
2	15.6	16.3			SLo	• Deodorizing control • Sleep Mode(Soft Dry)			• SLo: Hot Start Control
3	16.3	17.6		Lo⁻		• Auto operation mode judgement • Quiet operation			
4	17.6	20.3							
5	17.9	21.7							• Lo–: Hot Start Control Sleep Mode Anti Cold Draft Control Thermo OFF
6	18.4	23.4	Lo			• Sensible Heat Control (Lo) • On Timer preparatory operation + Auto Fan • Sleep mode (Cooling)			
7	18.7	24.0				• Sensible Heat Control (Me^-)		Auto Fan (Min.)	
8	19.3	24.4				• Manual Lo Fan + Powerful	Lo		• On Timer preparatory operation + Auto Fan
9	20.1	26.4				• Sensible Heat Control + Auto Fan			
10	21.4	27.1	Me^-			• Sensible Heat Control (Me)			• Manual Lo Fan + Powerful
11	22.0	27.8		Auto Fan		• Sensible Heat Control + Auto Fan			• Auto Fan (min) + Powerful
12	22.7	28.3				• Manual Me^- Fan + Powerful			
13	23.0	28.3		Auto Fan		• Sensible Heat Control (Me^+) • Auto Fan + Powerful • Sensible Heat Control + Auto Fan	Me^-		
14	23.1	28.4	Me			• Temporary Operation			
15	23.5	28.8		Auto Fan		• Auto Fan + Powerful		Auto Fan (Max.)	• Manual Me^- Fan + Powerful
16	24.3	29.1				• Manual Me Fan + Powerful • Sensible Heat Control (Hi)			
17	25.0	29.8				• Auto Fan + Powerful	Me		• Temporary operation
18	25.3	29.8	Me^+						
19	26.0	30.1							• Manual Me Fan + Powerful
20	26.4	30.5				• Manual Me^+ Fan + Powerful			
21	26.4	30.7							
22	26.5	30.8	Hi			• Test Run			
23	27.3	31.1					Me^+		
24	27.6	31.5				• Manual Hi Fan + Powerful			
25	28.0	31.9							• Manual Me^+ Fan + Powerful
26	28.3	32.3							
27	29.0	32.6				• SHi: Maximum Capacity Operation			• Auto Fan (max) + Powerful
28	29.3	32.6							
29	29.8	33.0							
30	29.8	33.4					SHi		• Manual Hi Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Test Run
31	32.7	36.9							• SSHi: Maximum Capacity Operation

Operation Details

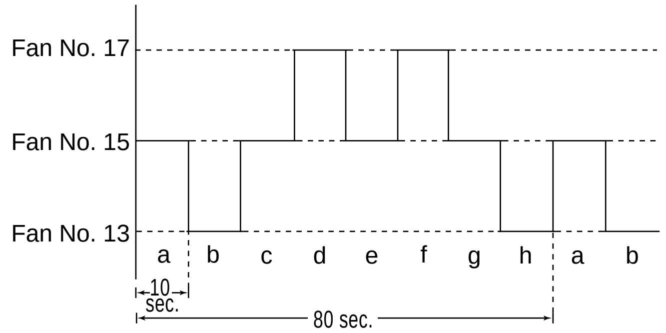
(a) Cooling Automatic Fan Speed

The Automatic Fan Speed for cooling operation is shown as below:

(i) When Automatic Fan Speed is selected



(ii) When Automatic Fan Speed and Powerful Mode are selected



Note: The Fan Speed will change every 10 seconds and it will be repeated from a to h every 80 seconds.

(b) Heating Automatic Fan Speed

The Automatic Fan Speed for heating operation is shown below:

- When Automatic Fan Speed is selected, the Fan Speed will change every 10 seconds from Fan Speed No. 7 to No. 15 depending on indoor heat exchanger temperature. Each time the Fan Speed will move 1 rank up or down.
- When Automatic Fan Speed and Powerful Mode are selected, the Fan Speed will change for every 10 seconds from Fan Speed No. 11 to No. 27 depend on heat exchanger temperature. Each time the Fan Speed will move 1 rank up or down.

Operation Details

(c) Cooling Operation at SHi Speed

During Cooling operation, Indoor Fan speed is set at SHi when the following conditions occur:

- Outside air temperature is 30°C or above
- Compressor operates at 50Hz (CU-G93KE) or 70Hz (CU-G123KE) and above
- Remote control setting fan speed is High
- Indoor intake air temperature is 24°C or above
- Remote control setting temperature is 16°C
- Within 30 minutes after start of operation.

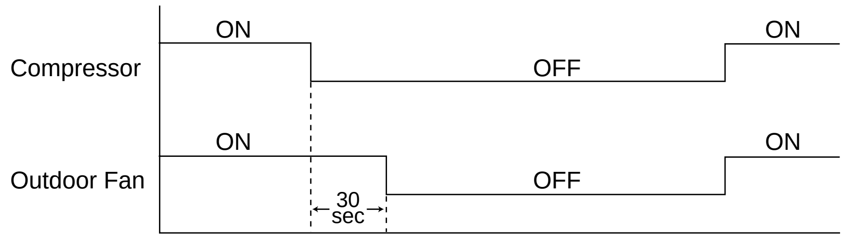
(d) Heating Operation at SSHi Speed

During Heating operation, Indoor Fan speed is set at SSHi when the following conditions occur:

- Heating operation for 2 hours or more
- When remote control setting fan speed is High
- Indoor intake air temperature is 17°C or above and less than 23°C
- Outdoor air temperature is below 4°C
- Remote control setting temperature is 30°C
- Compressor operates at 71Hz (CU-G93KE) or 90Hz (CU-G123KE) and above
- Airflow Direction is set at Manual.

8. OUTDOOR FAN CONTROL

- Outdoor fan motor is controlled with 1 speed only. Fan is in operation when the compressor starts operation and stops 30 seconds after compressor stops operation.



Operation Details

9. AIRFLOW DIRECTION

A. Vertical Airflow Direction

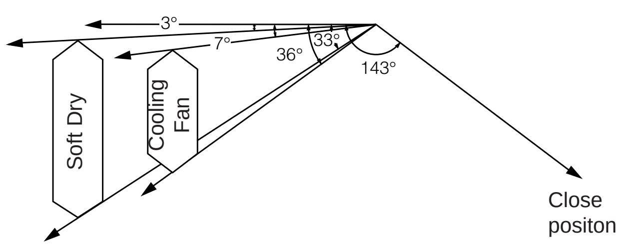
- Vane angle setting

Operation				Vane angle				
				1	2	3	4	5
Heating	Airflow direction auto	Indoor heat exchanger temperature	C	33°				
			B	70°				
			A	15°				
	Airflow direction manual	–		13°	33°	46°	57°	70°
Cooling	Airflow direction auto	–		7° ~ 36°				
		Anti-dew formation control		11° ~ 25°				
	Airflow direction manual	–		7°	15°	25°	33°	41°
		Anti-dew formation control		11°	15°	18°	22°	25°
Soft Dry	Airflow direction auto	–		3° ~ 33°				
		Anti-dew formation control		11° ~ 25°				
	Airflow direction manual	–		3°	8°	18°	25°	33°
		Anti-dew formation control		11°	15°	18°	22°	25°
Fan	Airflow direction auto			7° ~ 36°				
	Airflow direction manual			7°	15°	25°	33°	41°
Stop				143°				

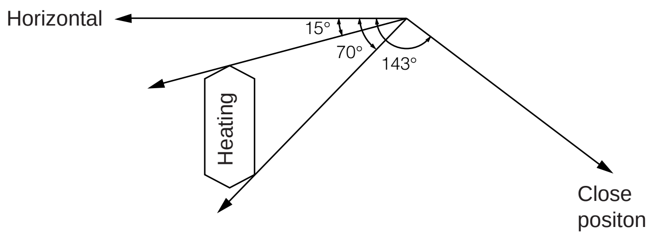
- Setting angle

Cooling, Soft Dry & Fan – Auto Airflow Direction

Horizontal

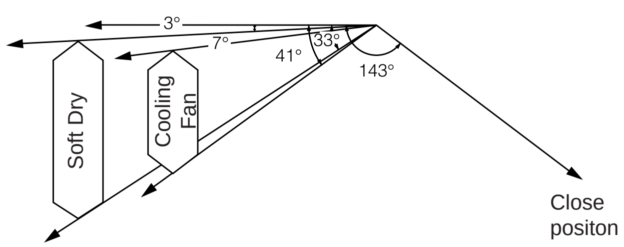


Heating – Auto Airflow Direction

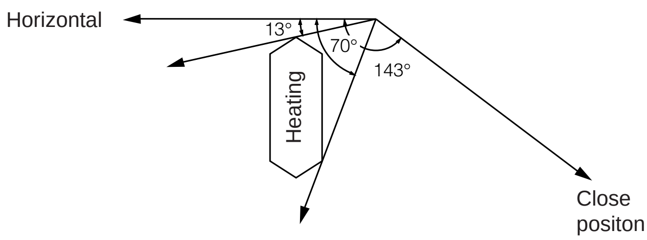


Cooling, Soft Dry & Fan – Manual Airflow Direction

Horizontal



Heating – Manual Airflow Direction



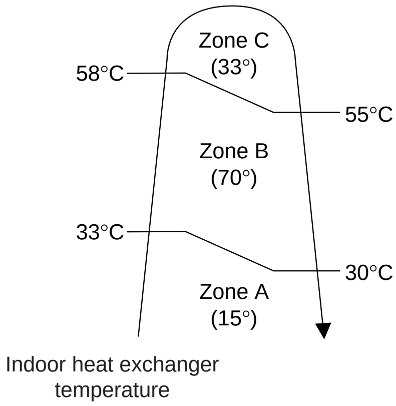
Operation Details

(a) Vertical Airflow Direction Manual

By pressing the remote control vertical airflow direction setting switch, the vane will move to the indicated angle (1, 2, 3, 4, 5) as shown in the table. When the remote control OFF/ON switch is pressed to stop the unit, the vane will move to the Close position.

(b) Vertical Airflow Direction Auto

By setting the vertical airflow direction to AUTO, the vane swings up and down from 7° ~ 36° (during Cooling and Fan) and 3° ~ 33° (during Soft Dry). During Heating operation, the vane angle will shift according to the indoor heat exchanger temperature as shown below.



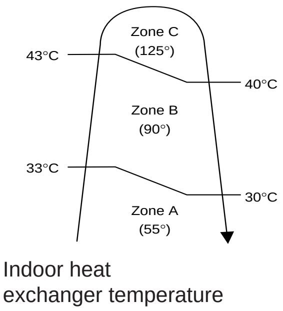
B. Horizontal Airflow Direction

(a) Automatic Horizontal Vane angle setting

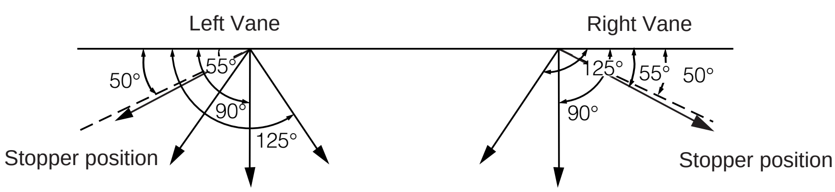
By setting the horizontal airflow direction to AUTO, the vanes swing left and right from 55° ~ 125° during Cooling, Soft Dry and Fan operation. During Heating operation, the vane angle will shift according to the indoor heat exchanger temperature as shown below:

Operation			Left Vane Position	Right Vane Position
Heating	Indoor heat exchanger temperature	C	125°	125°
		B	90°	90°
		A	55°	55°
Cooling			55° ~ 125°	55° ~ 125°
	Anti-dew formation control		64° ~ 110°	64° ~ 110°
Soft Dry			55° ~ 125°	55° ~ 125°
	Anti-dew formation control		64° ~ 110°	64° ~ 110°
Fan			55° ~ 125°	55° ~ 125°

Heating



Vane angle position



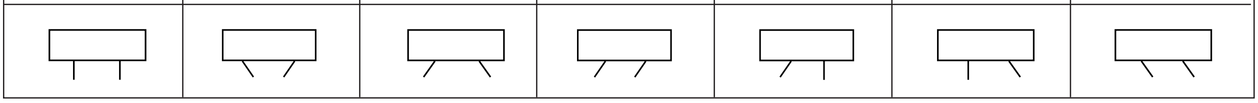
Operation Details

(b) Manual Horizontal vane angle setting

- By pressing the remote control horizontal airflow direction setting switch, the vane will move to the indicated position (1, 2, 3, 4, 5, 6, 7) as shown in the table.

- Horizontal vane angle position

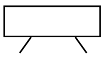
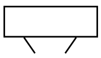
1	2	3	4	5	6	7



Operation		(Left vane position)							(Right vane position)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
Heating		90°	125°	55°	55°	55°	90°	125°	90°	125°	55°	125°	90°	55°	55°
Cool-ing		90°	125°	55°	55°	55°	90°	125°	90°	125°	55°	125°	90°	55°	55°
	Anti-dew Formation Control	90°	110°	64°	64°	64°	90°	110°	90°	110°	64°	110°	90°	64°	64°
Soft Dry		90°	125°	55°	55°	55°	90°	125°	90°	125°	55°	125°	90°	55°	55°
	Anti-dew Formation Control	90°	110°	64°	64°	64°	90°	110°	90°	110°	64°	110°	90°	64°	64°
Fan		90°	125°	55°	55°	55°	90°	125°	90°	125°	55°	125°	90°	55°	55°

(c) Wide / Spot Airflow Setting

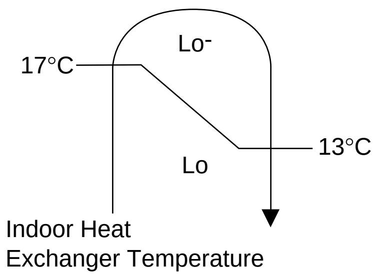
By pressing the remote control WIDE/SPOT switch, the vane will move to position 3 while WIDE and position 2 while SPOT.

	WIDE	SPOT
For All Operations	3 	2 

10. QUIET OPERATION

The purpose of this control is to reduce indoor operating noise. Indoor fan speed is set to Lo- when the following conditions occur.

- Indoor fan speed is set at Low
- Indoor heat exchanger temperature rises to 17°C or above
- Compressor operates for 5 minutes or more
- Operation frequency is less than 33Hz (CU-G93KE) or 36Hz (CU-G123KE)



This control is cancelled when one of the following conditions occurs.

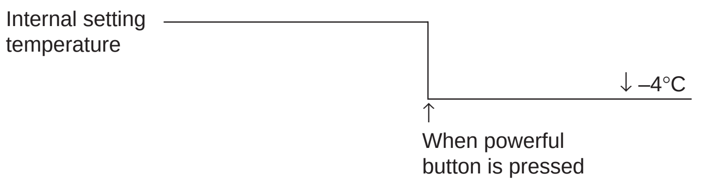
- Indoor fan speed is not set at Low
- Indoor heat exchanger temperature is decreased to 13° C or below
- Compressor operation frequency is more than 33Hz (CU-G93KE) or 36Hz (CU-G123KE)

Operation Details

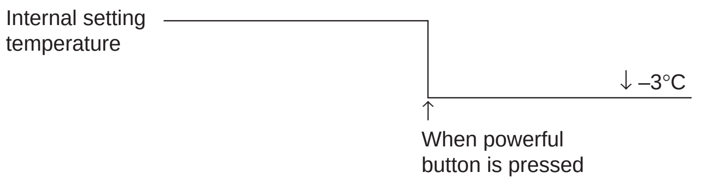
11. POWERFUL MODE OPERATION

When the powerful mode is selected, the internal setting temperature will shift to achieve the setting temperature quickly.

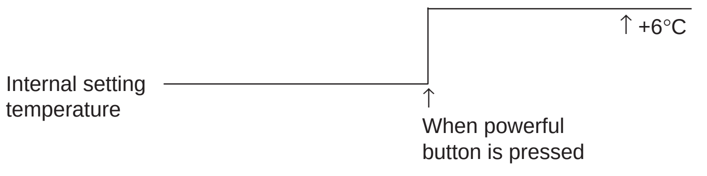
(a) Cooling Operation



(b) Soft Dry Operation



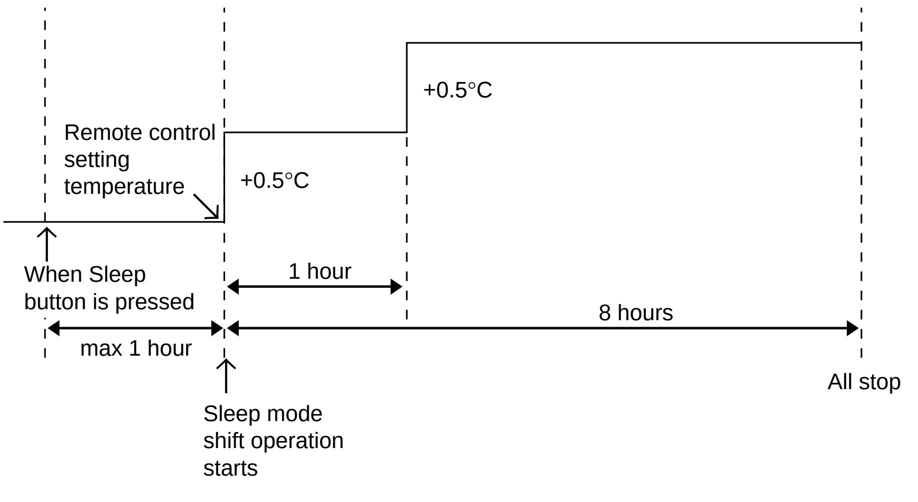
(c) Heating Operation



12. SLEEP MODE OPERATION

(a) Cooling Operation / Soft Dry Operation

- When the sleep button is pressed, the remote control setting temperature will increase 0.5°C after 1 hour or when the remote control setting temperature is reached. After another hour, 0.5°C will be increased again.

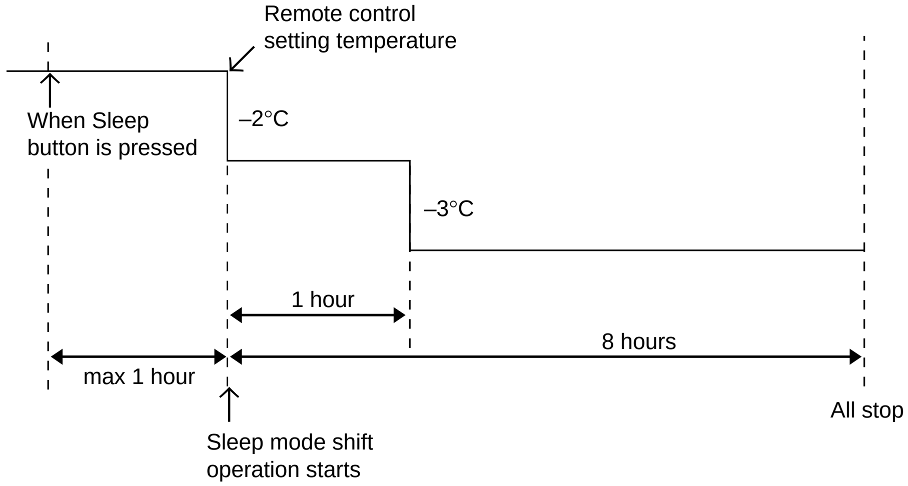


※ • During sleep shift operation, indoor fan speed operates at Lo (for Cooling operation) or SLo (for Soft Dry operation).

Operation Details

(b) Heating Operation

- When the sleep button is pressed, the remote control setting temperature will decrease 2°C after 1 hour or when the remote control setting temperature is reached. After another hour, 3°C will be decreased again.

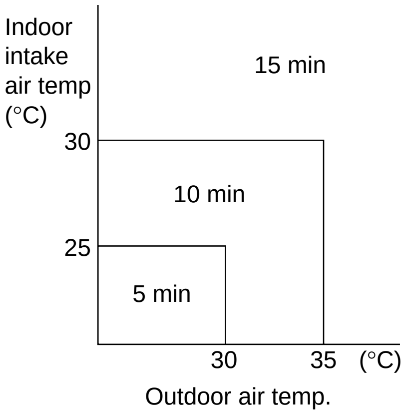


※ • During sleep shift operation, indoor fan speed operates at Lo⁻.

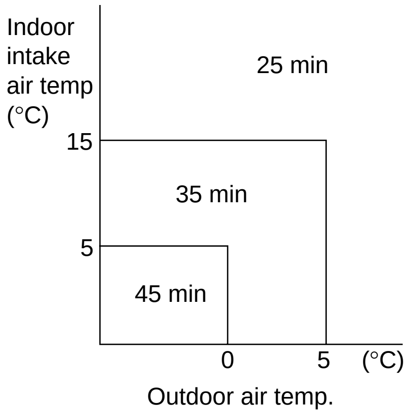
13. DELAY ON TIMER CONTROL

- When the Delay On Timer is set by using remote control, the unit will start to operate slightly earlier before the set time, so that the room will nearly reach the set temperature by the On Timer set time.
- 60 minutes before the set time, the indoor fan operates at Lo⁻ and outdoor fan operates for 20 seconds to sense the indoor intake air temperature and outdoor air temperature in order to determine the starting time for preparatory operation. (The Power LED blinks during sampling.)
- The time of the preparatory operation will start before the On Timer set time.

a. Cooling/Soft Dry



b. Heating

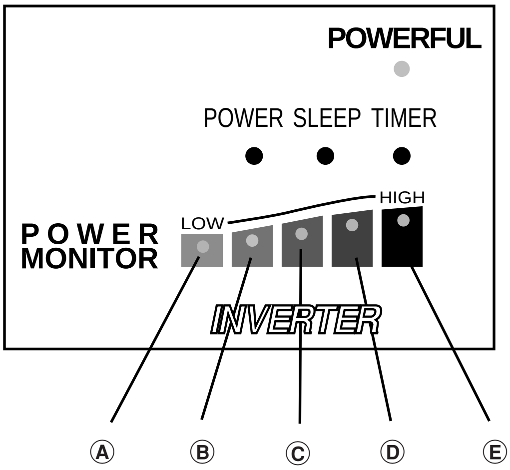


14. AUTO RESTART CONTROL

- If there is a power failure, operation will automatically be restarted when the power is resumed from 2 minutes 58 seconds to 3 minutes 52 seconds randomly. It will start with the previous operation mode and airflow direction.
- Auto Restart Control is not available when Timer or Sleep Mode is set.
- J1 at indoor electronic controller should be open circuit when cancellation of Auto Restart Control.

Operation Details

15. POWER MONITOR DISPLAY



Power Monitor LED lights on when the compressor is in operation. The number of the LED lights on is in accordance to the compressor operating frequency.

Model	Display	A	A, B	A, B, C	A, B, C, D	A, B, C, D, E
CS-G93KE	Cooling & Soft Dry Indication Frequency (Hz)	15 ~ 26	31 ~ 33	36 ~ 40	43 ~ 46	51 ~ 64
	Heating Indication Frequency (Hz)	15 ~ 26	31 ~ 40	43 ~ 58	63 ~ 64	71 ~ 99
CS-G123KE	Cooling & Soft Dry Indication Frequency (Hz)	15 ~ 27	31 ~ 36	44 ~ 49	58 ~ 64	71 ~ 92
	Heating Indication Frequency (Hz)	15 ~ 27	31 ~ 44	58 ~ 79	83 ~ 86	91 ~ 115

16. REMOTE CONTROL SIGNAL RECEIVING SOUND ON/OFF

- Press the AUTO button for 10 seconds or longer to switch off the signal receiving sound.
- Press the AUTO button for 10 seconds or longer again to switch on the signal receiving sound.

17. INDOOR POWER RELAY CONTROL

- The power relay turns on when one of the indoor LED lights on.
- The power relay turns off when all of the indoor LEDs lights off.
- When the air conditioner is stopped during operation, the power relay stays ON for 3 minutes.
- The power relay will turn off if a sudden power failure occurs ⩾ 0.05 second. The power relay will turn on again after 3 - 4 minutes (Refer AUTO RESTART CONTROL). It will start with the previous operation condition before the power failure.

Operation Details

B. PROTECTION

1. PROTECTION CONTROL FOR ALL OPERATIONS

a. Time Delay Safety Control

- The compressor is not restarted for 3 minutes after stop of compressor.

b. 30 Second Forced Operation

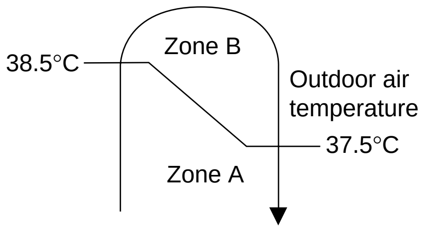
- Once the compressor is ON, it will not turn OFF for 30 seconds. However, it is turned off by remote control or Automatic switch.

c. Total Running Current Control

- When the outdoor unit total running current (AC) exceeds I1, the frequency is lowered by 1 rank. If I1 is not exceeded for 30 seconds, the frequency is highered by 1 rank at one time. If the outdoor unit total running current exceeds I2, the compressor is immediately stopped for 3 minutes.

<Cooling, Soft Dry set value>

	Zone A		Zone B	
Model No.	CU-G93KE	CU-G123KE	CU-G93KE	CU-G123KE
I1(A)	5.3	6.7	4.3	5.2
I2(A)	7.3	10.8	7.3	10.8



Note: Zone A will be used 30 minutes after operation starts.

<Heating set value>

Model No.	CU-G93KE	CU-G123KE
I1(A)	6.1	9.2
I2(A)	7.3	10.8

- If the outdoor unit total running current exceeds I2 3 times within 30 minutes, all indoor and outdoor relays will be turned off ; TIMER LED will blink and F98 is displayed.

d. IPM (Power transistor) Prevention Control

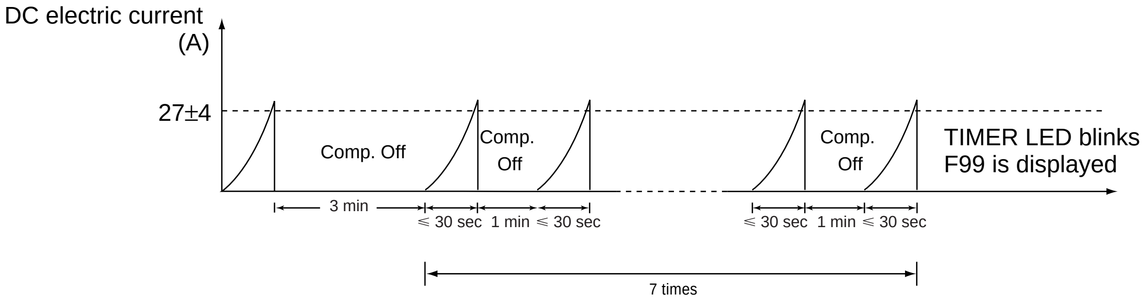
1. Overheating Prevention Control

- When the IPM (power transistor) temperature rises to 100 ± 10°C, the compressor stops immediately. The compressor is restarted when the IPM (power transistor) temperature decreases to 90 ± 10°C after 3 minutes (Time Delay Safety Control). If this condition occurs 4 times within 40 minutes, all indoor and outdoor relays will be turned off; TIMER LED will blink and F96 is displayed

Operation Details

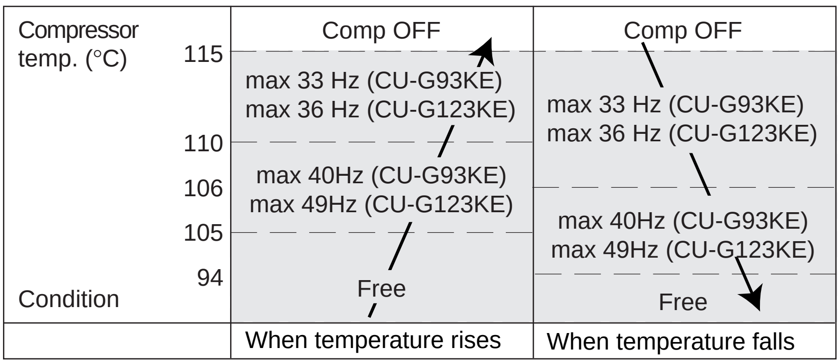
2. DC Peak Current Control

- When the electric current to the IPM (power transistor) exceeds the set value, DC 27 ± 4A, the compressor stops. The compressor restarts after 3 minutes.
- If within 30 seconds the set value is exceeded again, the compressor will stop for 1 minute. If this condition repeats for 7 times, all indoor and outdoor relays will be turned off; TIMER LED will blink and F99 is displayed.



e. Compressor Overheating Prevention Control

- When the temperature of compressor rises to 105°C, the frequency is reduced as shown in diagram below. When the temperature rises to 115°C or above, the compressor stops. The compressor will start operating at low frequency when the temperature falls to 115°C and resume to normal condition when the temperature falls to 94°C.



- The compressor stops when the temperature rises to 115°C. If this condition occurs 4 times within 20 minutes, all indoor and outdoors relays will be turned off; TIMER LED will blink and F97 is displayed.

f. Low Pressure Control (Gas Leakage Detection)

- When the following conditions as shown in the below table occur, the compressor stops and restarts after 3 minutes. If this phenomenon is continuously occuring twice within 30 minutes, all indoor and outdoor relays will be turned off; TIMER LED will blink and F91 is displayed.

Comp. Frequency ※	51 Hz and above	71 Hz and above	70 Hz and above	90 Hz and above
Total Running Current ※	≥ 1.88 A and < 1.9 A	≥ 1.88 A and < 2.1 A	≥ 1.88 A and < 2.4 A	≥ 1.88 A and < 2.7 A
Indoor Heat Exchanger Temp.	15°C or above	30°C or below	15°C or above	30°C or below
Operation	Cooling/Soft Dry	Heating	Cooling/Soft Dry	Heating
Model No.	CU-G93KE		CU-G123KE	

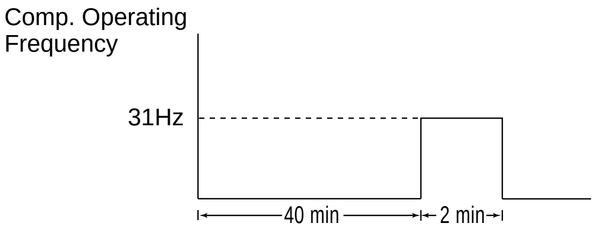
Note: The above conditions are not valid during Deice operation.

※ This conditions are continuous for 5 minutes.

Operation Details

g. Minimum Frequency Operation Protection

- When the compressor operates at less than 31 Hz for 40 minutes, the operating frequency will increase to 31 Hz for 2 minutes.



h. Low Frequency Operation Protection

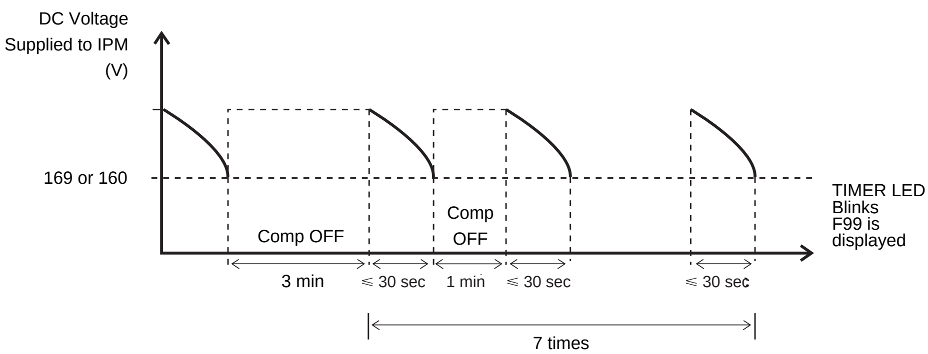
Indoor intake air temp. (°C)	≥ 30°C or < 15°C	≥ 28°C or < 14°C
Outdoor air temp. (°C)	≥ 38°C or < 16°C	≥ 24°C or < 4°C
Indoor heat exchanger temp. (°C)	< 30°C	> 0°C
Operation	Cooling/Soft Dry	Heating

- When the above conditions occur, the compressor will operate at minimum frequency as below:-

	CU-G93KE	CU-G123KE
Cooling / Soft Dry	Min 31Hz	Min 31Hz
Heating	Min 33Hz	Min 36Hz

i. Low Power Supply Voltage Protection

- When the DC voltage supplied to IPM (Power transistor) is reduced to 169 ± 5V (CS-G93KE) or 160 ± 5V (CS-G123KE) the compressor stops and restarts after 3 minutes.
- If within 30 seconds after restarting of compressor, the DC voltage is reduced to 169 ± 5V (CS-G93KE) or 160 ± 5V (CS-G123KE) again, the compressor will stop for 1 minute.
  If this condition repeats for 7 times, all indoor and outdoor relays will be turned off; TIMER LED will blink and F99 is displayed.



j. High Power Supply Voltage Protection

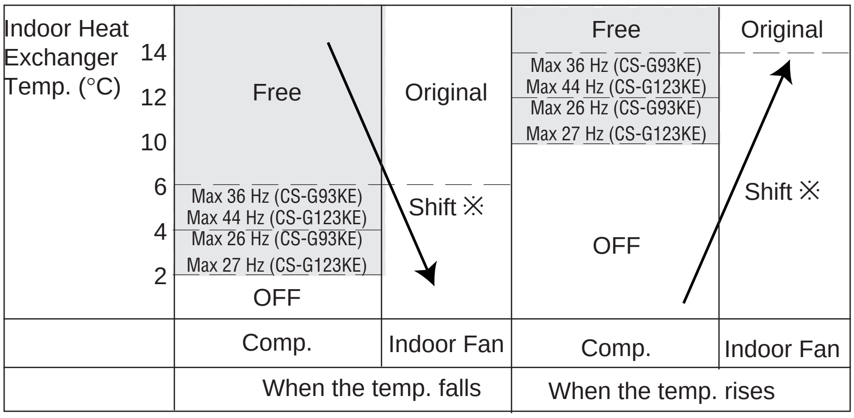
- When the voltage supply (AC) exceeds 295 ± 15 V (T_0), the air conditioner stops and restarts automatically when the voltage supply (AC) is below (T_0 - 5)V. However, waiting for 3 minutes is necessary for re-operation.

Operation Details

2. PROTECTION CONTROL FOR COOLING & SOFT DRY

a. Anti-Freezing Control

- When the temperature of the indoor heat exchanger becomes low, the compressor operating frequency is reduced and stopped when the temperature falls to lower than 2°C continuously for 6 minutes. This is to prevent freezing of indoor heat exchanger. When the temperature rises to 10°C or above, the compressor restarts with 3 minutes. The compressor operating frequency will resume to normal when the temperature reaches 14°C.
- Indoor fan speed will increase when the temperature falls and it will resume to original speed when the temperature increases to 14°C for 5 minutes continuously.



※ Indoor Fan Speed Shift

Fan Speed	Shift ※
Me+	2 rank up
Me	1 rank up
Me-	1 rank up
Lo	2 rank up
AUTO FAN	1 rank up

Note: The above phenomenon occurs when the fan is running at Me+ or below.

b. Anti-Dew Formation Control

- When the following conditions occur for 20 minutes continuously, anti-dew formation is controlled:

  1. Indoor intake air temperature is 24°C or above.
  2. Outdoor air temperature is less than 30°C.
  3. Remote control setting temperature is less than 25°C.

- During anti-dew formation control, compressor operates at 36 Hz (CS-G93KE) or 44 Hz (CS-G123KE) and airflow direction vane move slightly (as shown in Airflow Direction Control). Indoor fan speed will shift as below:

Fan Speed	Shift
Hi	2 rank down
Me+	3 rank up
Me	unchange
Me-	unchange
Lo	2 rank up

- This control is cancelled immediately when either condition 1–3 as written above is changed, or remote control setting temperature or fan speed is changed.

Operation Details

c. Anti-Fog Discharge Control

- The compressor operating frequency is regulated by operation time to prevent fog discharged from indoor unit as shown in the table below.

		Compressor operating frequency	
Operation Time, T (min)	$0 \le T < 30$	50Hz	70Hz
	$30 \le T < 90$	46Hz	64Hz
	$T \ge 90$	43Hz	58Hz
Model No.		CU-G93KE	CU-G123KE

Note: • Indoor fan is running at Me- or below.
• After 420 minutes from the start of operation, the operation timer counting is restarted from “0”.

d. High Pressure Control at Minimum Frequency Control

- When the outdoor air temperature increases to 38.6°C, compressor operating frequency reduces to minimum of 31 Hz. Compressor operating frequency will resume to normal when outdoor air temperature decreases to 37.8°C.

Operation Details

3. PROTECTION CONTROL FOR HEATING OPERATION

a. Intake Air Temperature Control

- When the intake air temperature is 10°C or above and remote control setting fan speed is less than Me-, the compressor operates maximum at 71 Hz (CU-G93KE) or 90 Hz (CU-G123KE).

- When the intake air temperature is 30°C and above, the compressor operates maximum at 71 Hz (CU-G93KE) or 90 Hz (CU-G123KE).

b. Outdoor Air Temperature Control

- The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below. This control will begin 50 seconds after the compressor starts.

Outdoor air Temperature (°C)	21 19 12 10	43 Hz 64 Hz Free	43 Hz 64 Hz Free	58 Hz 86 Hz Free	58 Hz 86 Hz Free
Condition		When temp. rises	When temp. falls	When temp. rises	When temp. falls
Model No.		CU-G93KE		CU-G123KE	

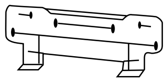
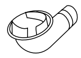
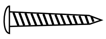
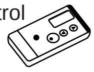
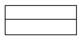
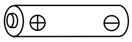
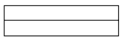
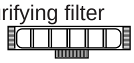
c. High Pressure Control

- The compressor operating frequency is regulated in accordance to the indoor heat exchanger temperature.

Indoor heat exchanger temp. (°C)	59 53 51 47 43 37	OFF 33 Hz Min 33 Hz Free	OFF 33 Hz Max 43 Hz Max 53 Hz Min 33 Hz Free	OFF 36 Hz Min 36 Hz Free	OFF 36 Hz Max 58 Hz Max 74 Hz Min 36 Hz Free
Condition		When temp. rises	When temp. falls	When temp. rises	When temp. falls
Model No.		CU-G93KE		CU-G123KE	

Installation Information

Attached accessories

No.	Accessories part	Qty.	No.	Accessories part	Qty.
1	Installation plate 	1	6	Drain elbow 	1
2	Installation plate fixing screw 	6	7	Band	1
3	Remote control 	1	8	Vinyl tape 	3
4	Battery 	2	9	Vinyl tape 	1
5	Air purifying filter 	2			

Accessories: Flaring piping kit
CZ-3F5, 7AEN (CS-G93KE)
CZ-4F5, 7AEN (CS-G123KE)

SELECT THE BEST LOCATION

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Indoor unit of this room air conditioner shall be installed on the wall in a height of at least 2.3 m.

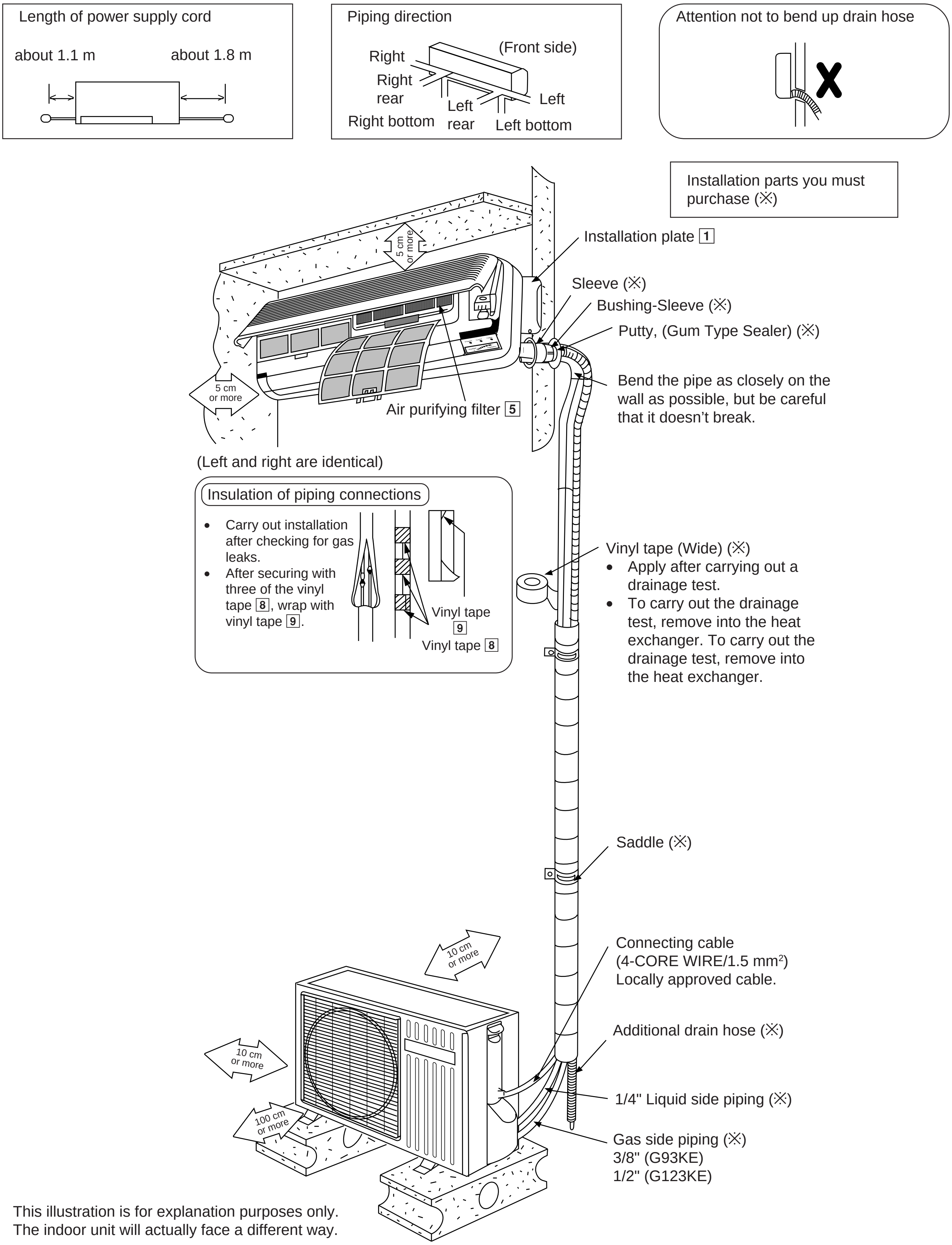
OUTDOOR UNIT

- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.

MODEL	Piping size		Rated Length	Max. Elevation (m)	Max. Piping Length (m)
	Gas	Liquid			
G93KE	3/8"	1/4"	5	5	7
G123KE	1/2"	1/4"	5	5	7

Installation Information

Indoor / Outdoor unit installation diagram



- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

Servicing Information

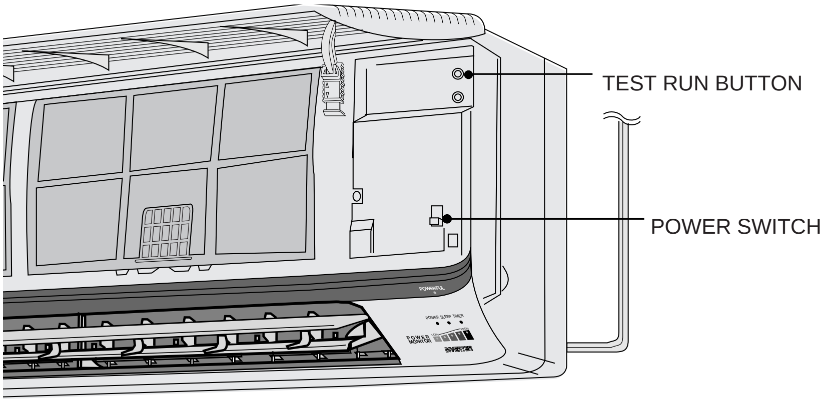
A. TROUBLESHOOTING

1. RATED FREQUENCY OPERATION

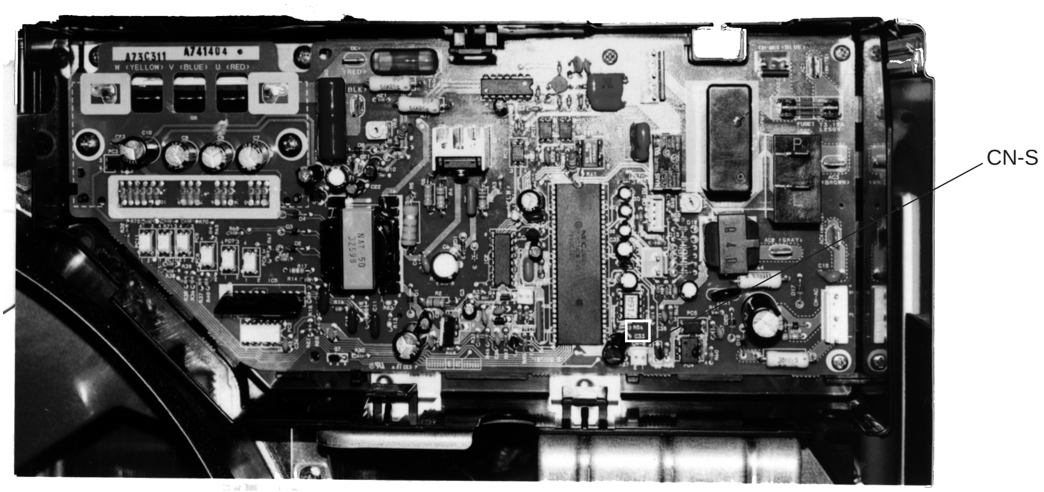
During troubleshooting and servicing, rated compressor operating frequency must be obtained in order to check the specification and technical data. Below are the methods used to obtain rated compressor operating specification.

(a) Cooling

(i) Press the Test Run button on the indoor unit. The air conditioner starts operation at Cooling rated frequency.



(ii) Short the service terminal (CN-S) of the outdoor printed circuit board. The air conditioner starts operation at Cooling rated frequency.



(b) Heating

Keep pressing the Test Run button, switch off and on the Power Switch, then release the Test Run button. The air conditioner starts operation at Heating rated frequency.

Servicing Information

2. TROUBLESHOOTING AIR CONDITIONER

Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor or a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions; the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

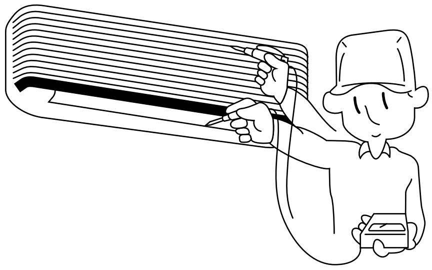
	Gas pressure MPa (kg/cm²G)	Outlet air temperature (°C)
Cooling mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16
Heating Mode	1.5 ~ 2.1 (15 ~ 21)	36 ~ 45

★ Condition:
- Indoor fan speed; High.
- Outdoor temperature is 35°C at cooling mode and 7°C at heating mode.
- Compressor operates at rated frequency.

Difference in the intake and outlet air temperatures

- Above 8°C (15 minutes after an operation is started.) at cooling mode / Above 14°C (15 minutes after an operation is started.) at heating mode → Normal
- Less than 8°C at cooling mode / Less than 14°C at heating mode ↓

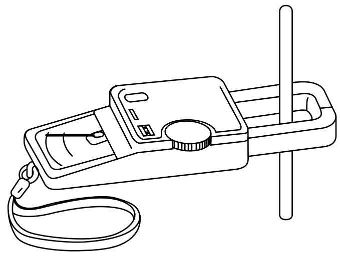
- **Measure the air temperature difference**



Value of electric current during operation

- Higher than specified → Dusty condenser preventing heat radiation
- Higher than specified → Excessive amount of refrigerant
- Lower than specified ↓

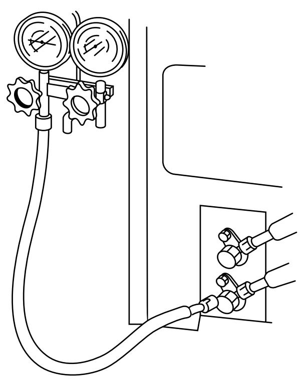
- **Measure the electric current during operation**



Gas side pressure

- Cooling Mode
  - High → Inefficient compressor
  - Low → Insufficient refrigerant
  - Low → Clogged strainer or capillary tube
- Heating Mode
  - Low → Inefficient compressor
  - Low → Insufficient refrigerant
  - Low → Clogged strainer or capillary tube

- **Measure the gas side pressure**



Servicing Information

1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)	↘	↘	↘	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘	↗	↗	↗
Short circuit in the indoor unit	↘	↘	↘	↗	↗	↗
Heat radiation deficiency of the outdoor unit	↗	↗	↗	↘	↘	↘
Inefficient compression	↗	↘	↘	↗	↘	↘

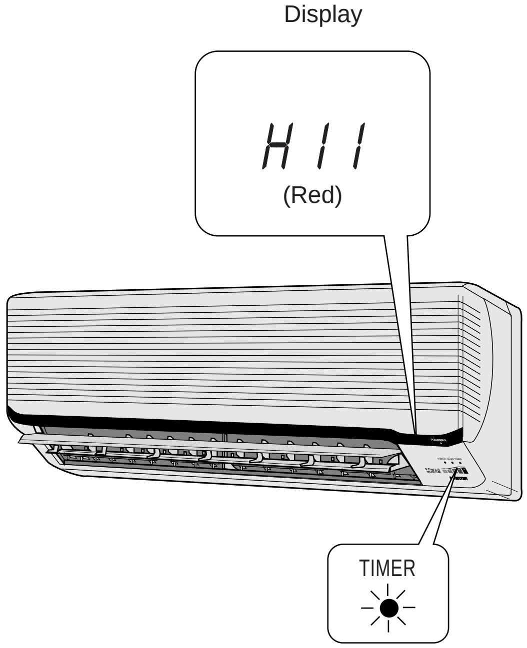
- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

Servicing Information

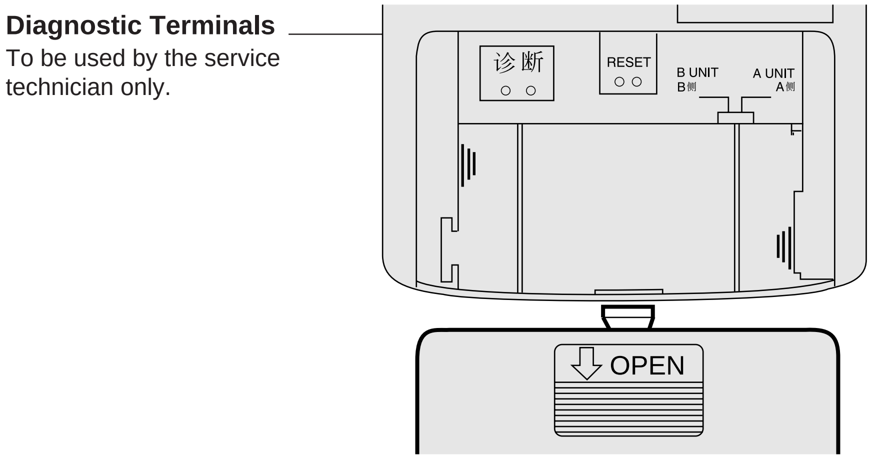
B. SELF DIAGNOSIS DISPLAY

The diagnostic display can be seen on the receiver of the Front Grille.

- When an abnormality occurs, the unit automatically stops, and the TIMER LED blinks to indicate a malfunction. At the same time, the type of abnormality will be indicated on the receiver as shown in the diagram below. Providing this information reduces the time spent in diagnosing procedures.



- The diagnostic display disappears when the power is turned off.
- When power is re-supplied and the Diagnostic Terminals the Remote Control is shorted, the type of the previous abnormality and the protection control works will be displayed on the receiver for approximately 10 seconds.



- By starting cooling operation using TEST RUN button and short the Diagnostic Terminals at the remote control, the previous abnormalities are deleted.
- Depending on the type of abnormality, you may be able to override the abnormality and use temporary operation (for abnormalities indicated by ◯ mark in the table).
  Use the remote control to select cooling or heating operation mode and press OFF/ON button. At this moment, four short beeps “bip.bip.bip.bip” will sound and TIMER LED will blink.

Servicing Information

Diagnosis display	Abnormality / Protection control	Abnormality Judgement	Temporary operation	Primary location to verify
H11	Indoor / outdoor abnormal communication	1 min after starting operation	–	• Internal / external cable connections • Indoor / Outdoor PCB
H14	Indoor intake air temperature sensor abnormality		–	• Intake air temperature sensor (defective or disconnected)
H15	Outdoor compressor temperature sensor abnormality		–	• Compressor temperature sensor (defective or disconnected)
H16	Outdoor Current Transformer open circuit		–	• Outdoor PCB • IPM (Power transistor) module
H19	Indoor fan motor mechanism lock		–	• Indoor PCB • Fan motor
H23	Indoor heat exchanger temperature sensor abnormality		○ (Cooling only)	• Heat exchanger temperature sensor (defective or disconnected)
H27	Outdoor air temperature sensor abnormality		○	• Outdoor temperature sensor (defective or disconnected)
H28	Outdoor heat exchanger temperature sensor abnormality		○	• Outdoor heat exchanger temperature sensor (defective or disconnected)
H98	Indoor high pressure protection		–	• Air filter dirty • Air circulation short circuit
H99	Indoor heat exchanger anti-freezing protection		–	• Insufficient refrigerant • Air filter dirty
F11	Cooling / Heating cycle changeover abnormality	4 times occurance within 40 minutes	–	• 4-way valve • V-coil
F91	Refrigeration cycle abnormality	2 times occurance within 30 minutes	–	• No refrigerant (3-way valve is closed)
F93	Outdoor compressor abnormal revolution	4 times occurance within 30 minutes	–	• Compressor • Outdoor PCB
F96	IPM (power transistor) overheating protection	4 times occurance within 40 minutes	–	• Excess refrigerant • Improper heat radiation • IPM (Power transistor)
F97	Outdoor compressor overheating protection	4 times occurance within 20 minutes	–	• Insufficient refrigerant • Compressor
F98	Total running current protection	3 times occurance within 30 minutes	–	• Excess refrigerant • Improper heat radiation
F99	Outdoor Direct Current (DC) peak detection	7 times occurance continuously	–	• Outdoor PCB • IPM (Power transistor) • Compressor

Servicing Information

(a) Current Transformer Defective

When the Current Transformer (CT) is an open circuit, total running current is less than 1.88 A and the indicated frequency is 53 Hz (CU-G93KE) or 74 Hz (CU-G123KE) or above. If this condition continues for 20 seconds, the abnormality signal is sent from outdoor to indoor after 3 minutes of operation and [H16] is displayed.

(b) 4 Way Valve Defective

i. Heating Operation (except Deice)

When the indoor heat exchanger temperature is lower than 5°C after 4 minutes of operation, the operation stops and restarts after 3 minutes. If this phenomenon occurs for 4 times within 40 minutes, [F11] is displayed.

ii. Cooling Operation

When the indoor heat exchanger temperature is higher than 45°C after 4 minutes of operation, the operation stops and restarts after 3 minutes. If this phenomenon occurs for 4 times within 40 minutes, [F11] is displayed.

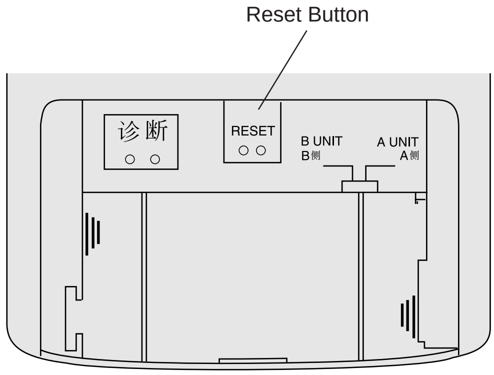
The abnormality is not judged in the following conditions:
- deice operation
- 2 minutes after deice operation
- hot start
- 2 minutes after hot start
- 3 minutes after heating and cooling/soft dry mode changeover

Servicing Information

C. REMOTE CONTROL

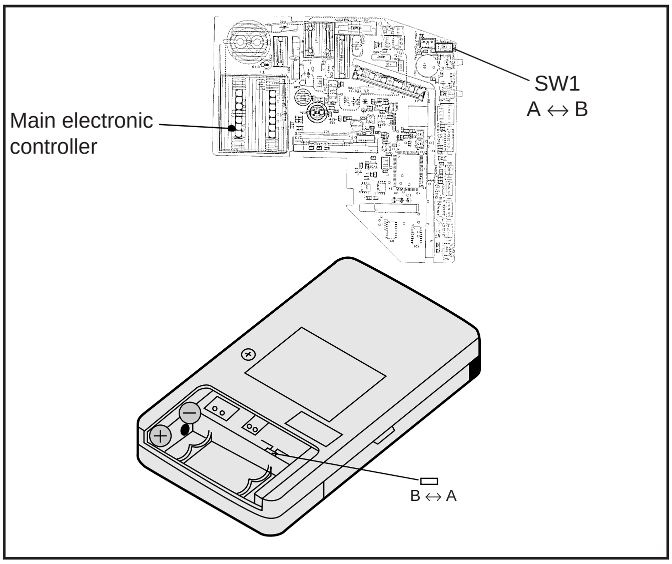
a. Remote Control Reset

When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work. If this happens, remove the back cover of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal.



b. Changing the wireless remote control transmission code

When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, set up the remote control [B ↔ A] switch (SW1).
The unit is set to A when it is shipped.



By adding a jumper wire to the remote control side and shorting the J2 at the indoor printed circuit board, it is possible to select 4 transmission codes including one at time of delivery condition (1).

	Remote control		Indoor printed circuit board		Note
	Switch SW B ↔ A	J – B	Switch SW1	J2	
1	A	———	A	———	At product delivery
2	B	———	B	———	
3	A	Jumper wire	A	Shorted	
4	B	Jumper wire	B	Shorted	

Servicing Information

D. DISASSEMBLY OF PARTS

a. Indoor Control Board Removal Procedure

1. Remove the Front Grille

Fig. 1

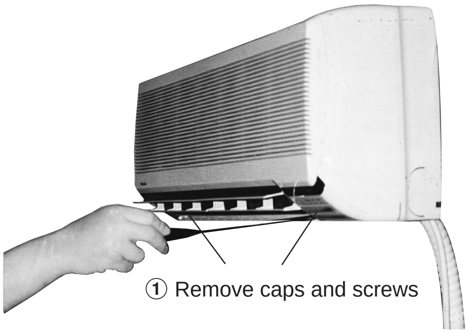
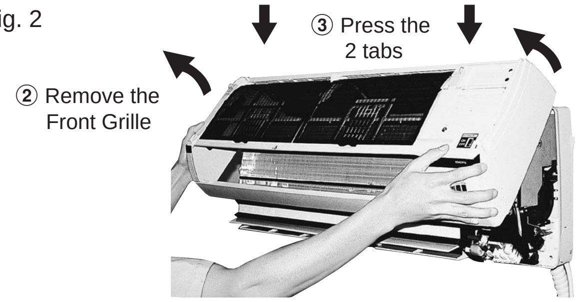


Fig. 2



2. Remove the Indoor Control Board

Fig. 3

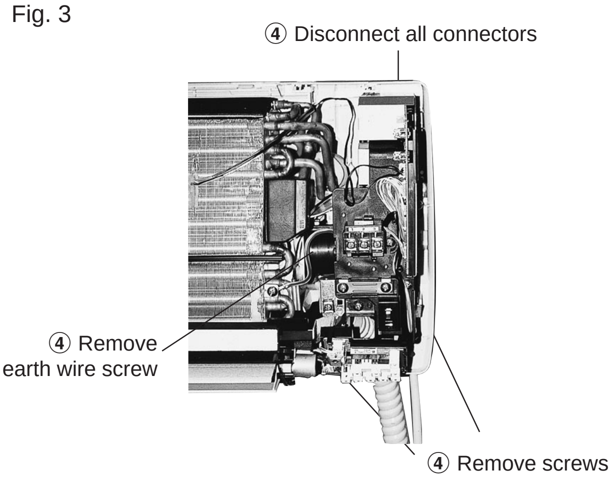
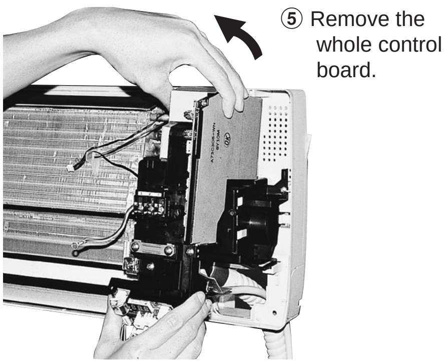


Fig. 4



Note : Remove the indoor and outdoor connecting wires from terminal 1, 2, 3 and ⏚.

Servicing Information

b. Removal of Electronic Controller Procedure

Fig. 5

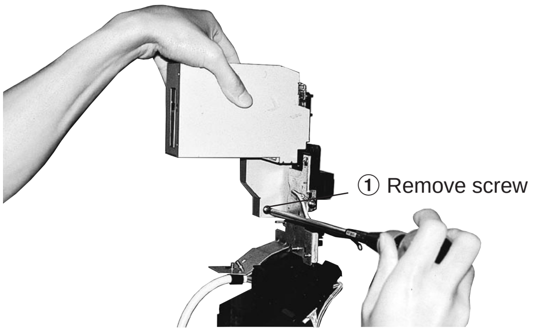


Fig. 6

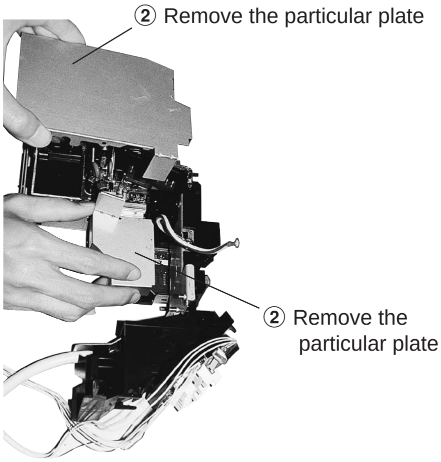


Fig. 7

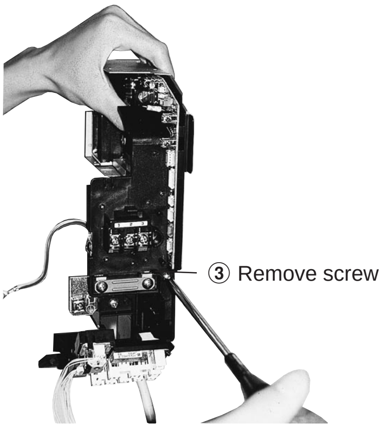


Fig. 8

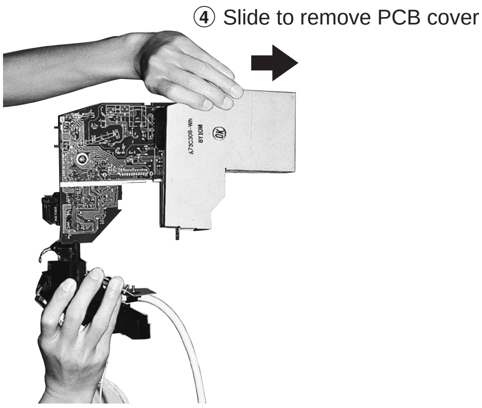


Fig. 9

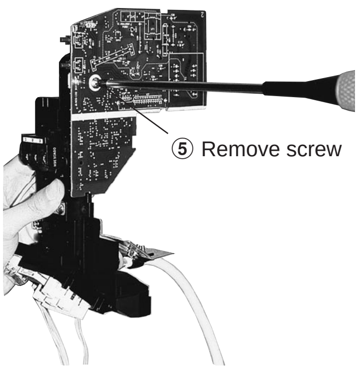
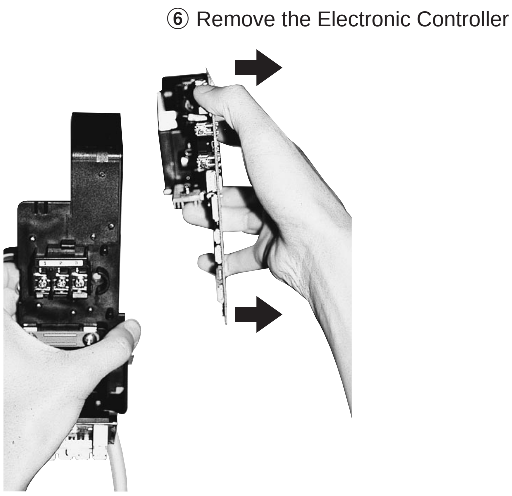


Fig. 10



Servicing Information

c. Indoor Fan Motor Removal Procedure

Fig. 11

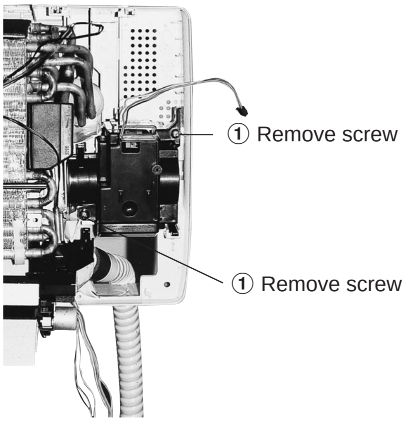


Fig. 12

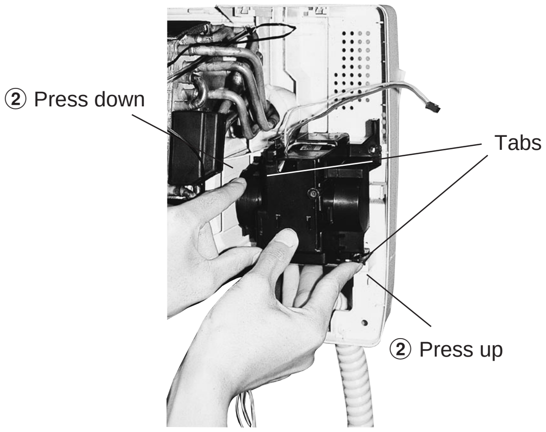


Fig. 13

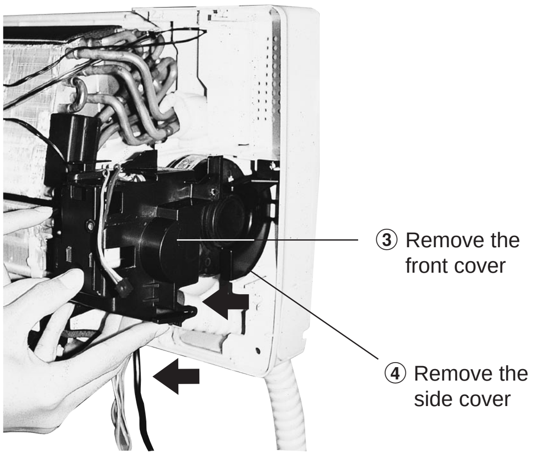


Fig. 14

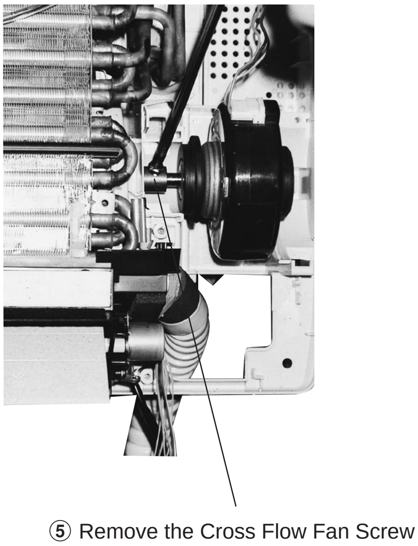
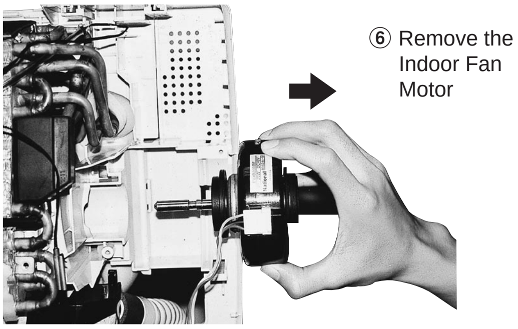


Fig. 15

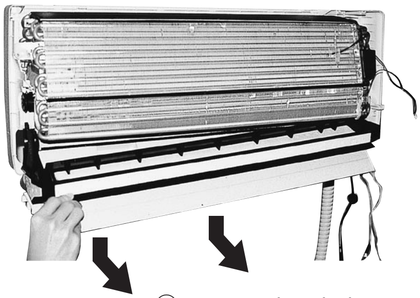


Servicing Information

d. Cross Flow Fan Removal Procedure

1. Remove Discharge Grille

Fig. 16



1. Remove Cross Flow Fan

Fig. 17

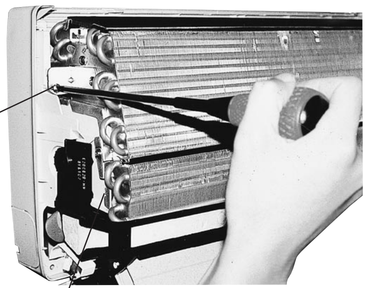


Fig. 18

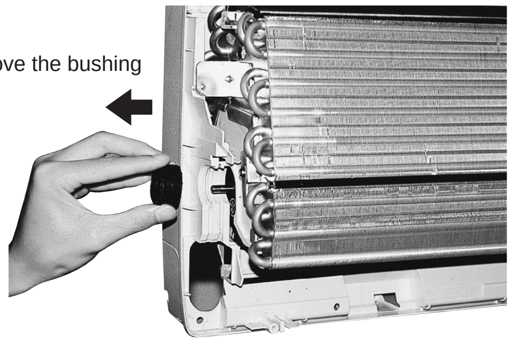
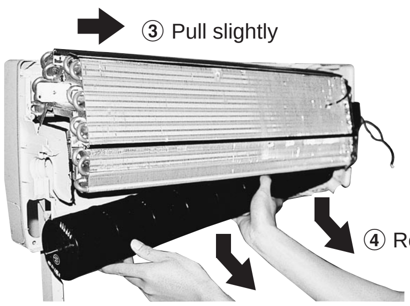


Fig. 19



Servicing Information

c. Outdoor Electronic Controller Removal Procedure

⚠ WARNING

- Be save to return the wiring to its original position
- There are many high voltage components within the heat sink cover so never touch the interior during operation. Wait at least two minutes after power has been turned off.

1. Remove the top panel and front panel

Fig. 20

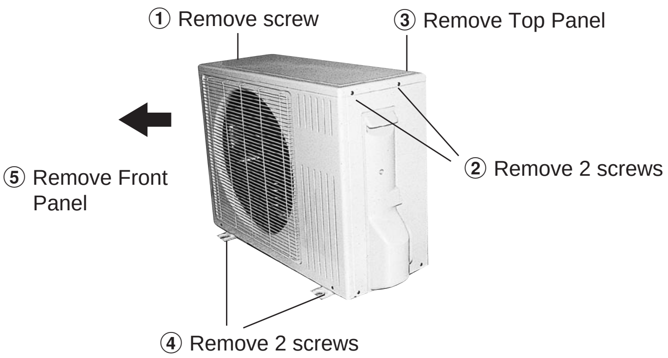
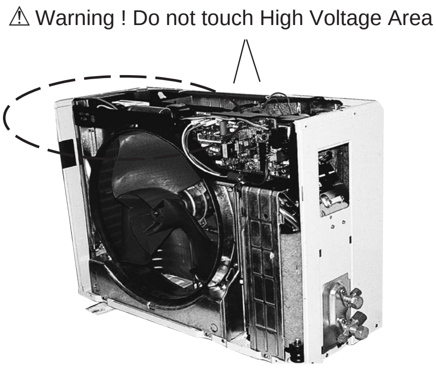
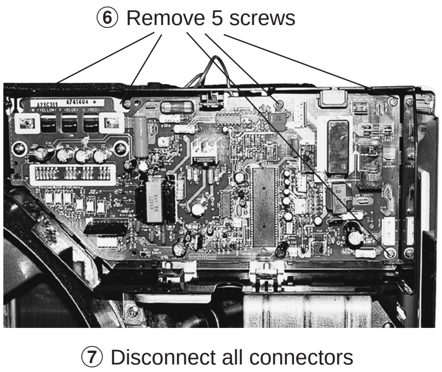


Fig. 21



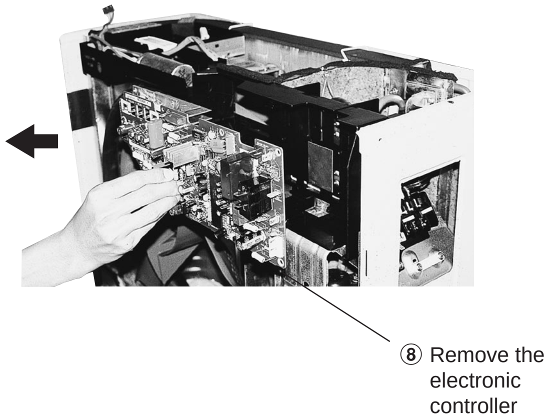
2. Remove the Outdoor Electronic Controller

Fig. 22



⚠ Caution! When handling electronic controller, be careful of electrostatic discharge.

Fig. 23



Note : Use magnetic type of screw driver to avoid dropping of the screws

Servicing Information

f. Propeller Fan Removal Procedure

Fig. 24

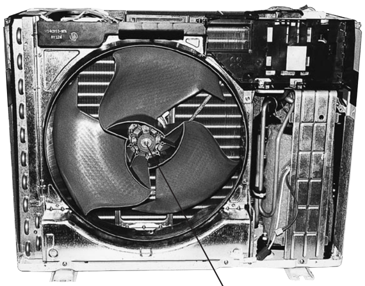
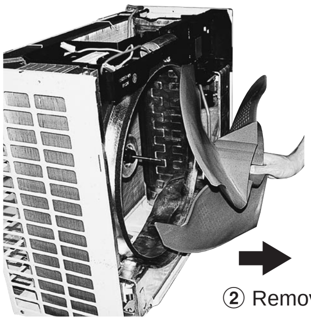


Fig. 25



g. Outdoor Fan Motor Removal Procedure

Fig. 26

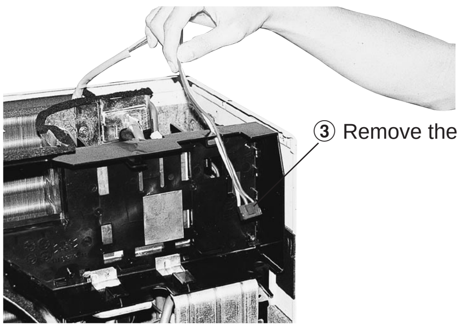


Fig. 27

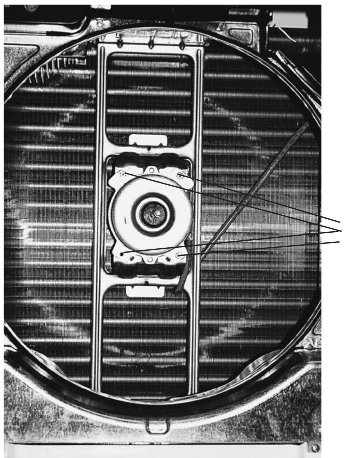
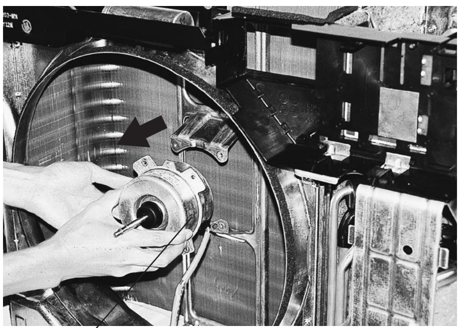


Fig. 28

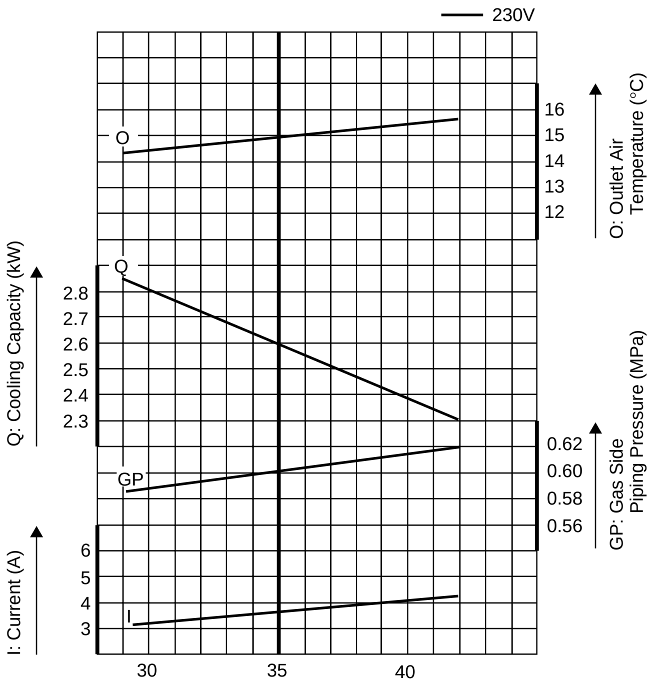


Technical Data

Operation characteristics

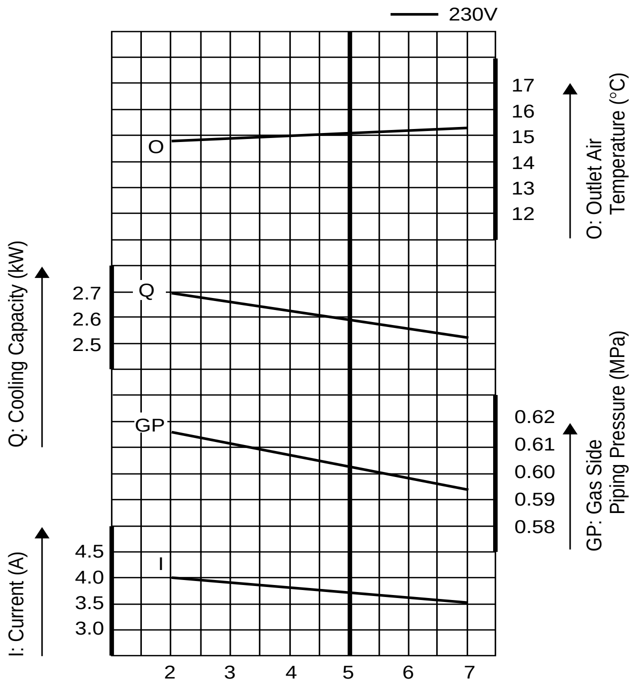
CS-G93KE / CU-G93KE

- **Cooling Characteristic**



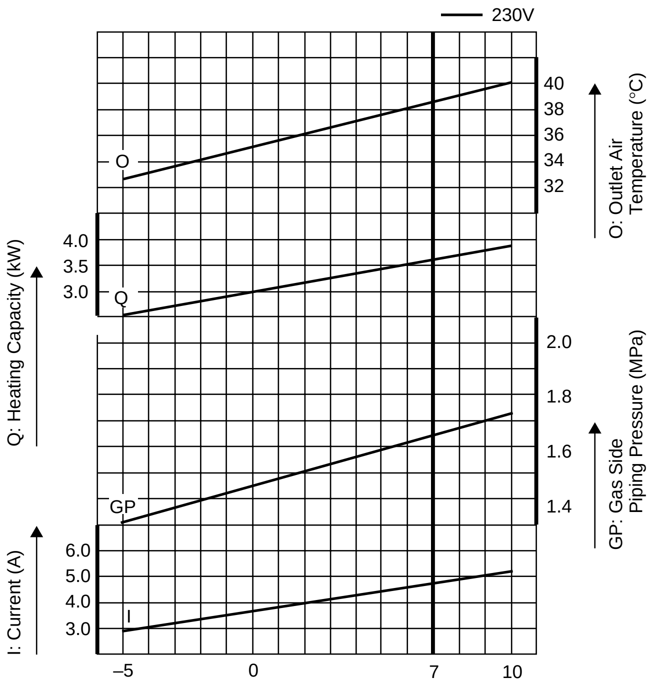
OUTDOOR AIR TEMPERATURE (°C)
[Condition] Room temperature: 27/19°C
Cooling Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Cooling)**



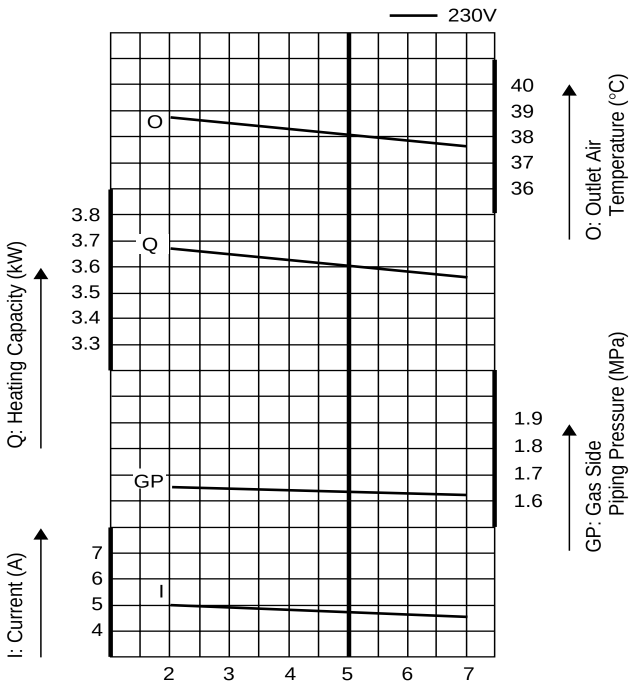
PIPING LENGTH (m)
[Condition] Room temperature: 27/19°C
Cooling Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Heating Characteristic**



OUTDOOR AIR TEMPERATURE (°C)
[Condition] Room temperature: 20°C
Heating Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Heating)**



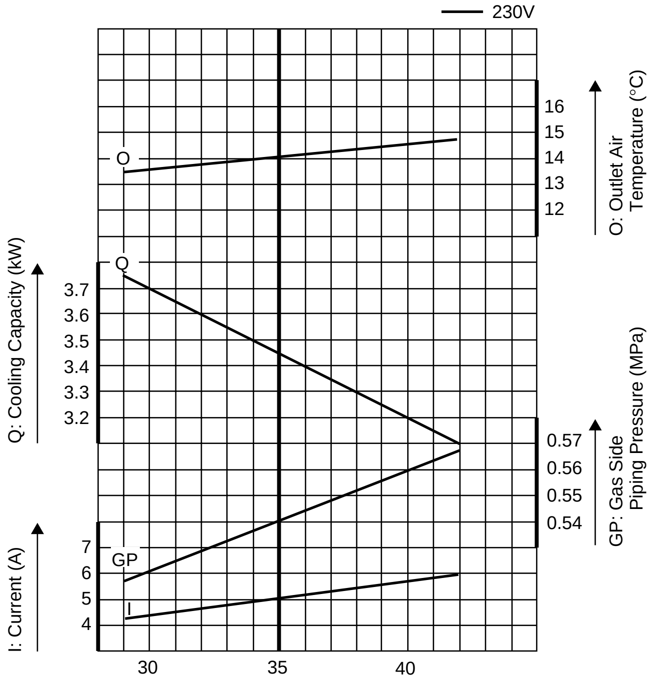
PIPING LENGTH (m)
[Condition] Room temperature: 20°C
Heating Operation: 7/6°C
Piping length: at High Fan
Rated Frequency Operation

Technical Data

Operation characteristics

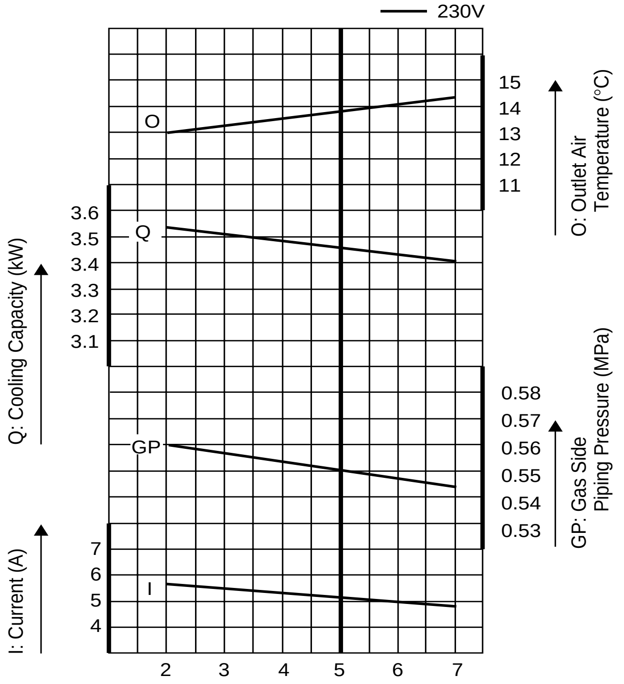
CS-G123KE / CU-G123KE

- **Cooling Characteristic**



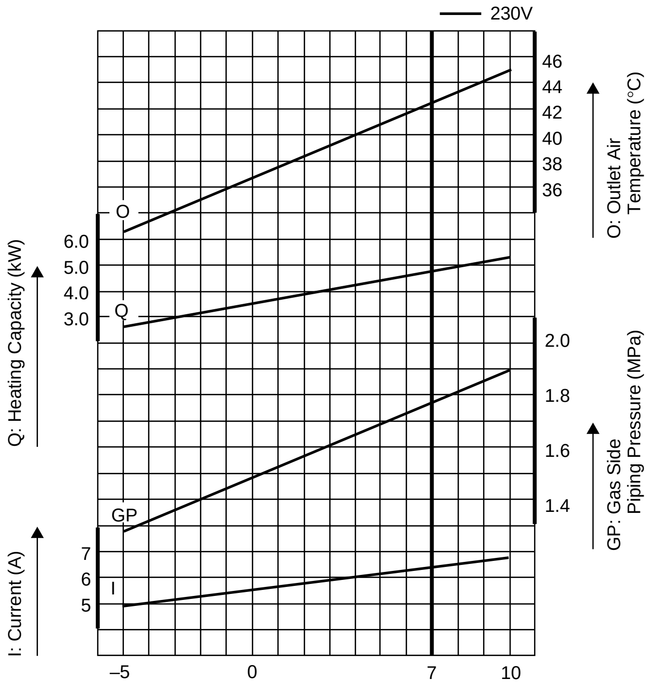
OUTDOOR AIR TEMPERATURE (°C)
[Condition] Room temperature: 27/19°C
Cooling Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Cooling)**



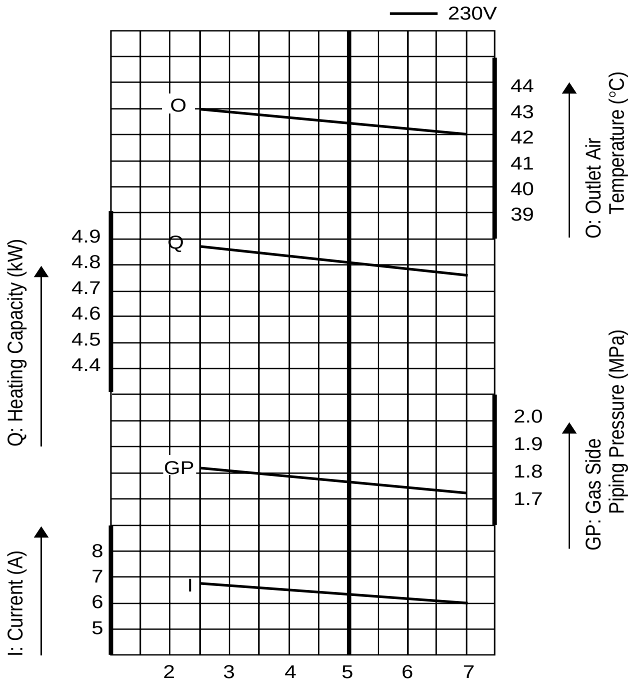
PIPING LENGTH (m)
[Condition] Room temperature: 27/19°C
Cooling Operation: 35/24°C
Piping length: at High Fan
Rated Frequency Operation

- **Heating Characteristic**



OUTDOOR AIR TEMPERATURE (°C)
[Condition] Room temperature: 20°C
Heating Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

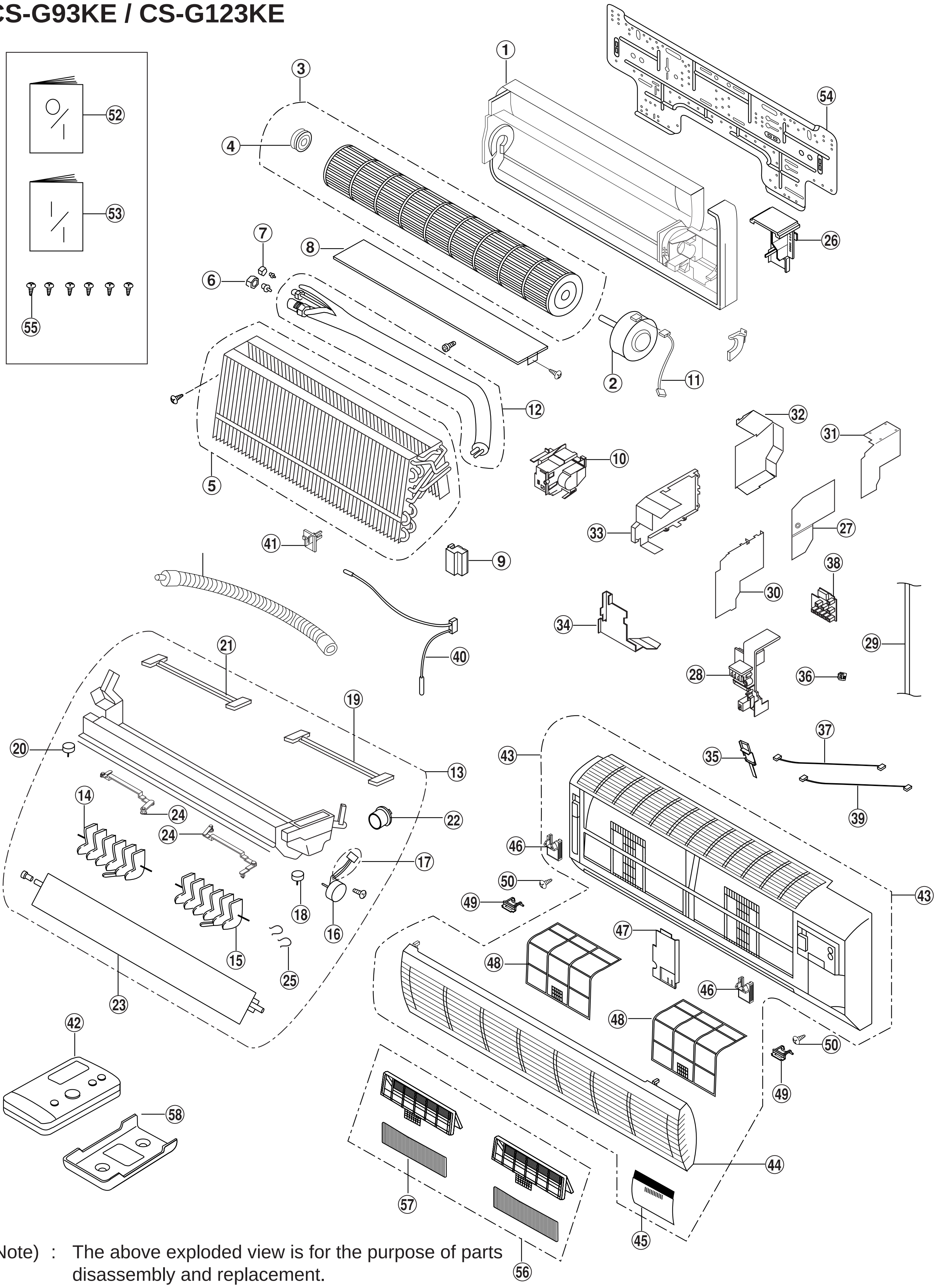
- **Piping Length Characteristic (Heating)**



PIPING LENGTH (m)
[Condition] Room temperature: 20°C
Heating Operation: 7/6°C
Piping length: at High Fan
Rated Frequency Operation

Exploded View

CS-G93KE / CS-G123KE



(Note) : The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

Replacement Parts List

<Model: CS-G93KE / CS-G123KE>

NO.	DESCRIPTION & NAME	QTY	CS-G93KE	CS-G123KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C338	←	
2	FAN MOTOR	1	CWA98244	←	O
3	CROSS FLOW FAN	1	CWH02C060	←	
4	BEARING	1	CWH64K007	←	
5	EVAPORATOR	1	CWB30C271	←	
6	“FLARE NUT (1/2””) OR (3/8””)”	1	“CWT25005 (3/8")”	“CWT25007 (1/2")”	
7	“FLARE NUT (1/4””)”	1	CWH6002140	←	
8	SPACER COMPLETE	1	CWH54C031	←	
9	ANTI VIBRATION BUSHING	1	CWH50211	←	
10	FAN MOTOR COVER	1	CWD931039	←	
11	LEAD WIRE - FAN MOTOR	1	CWA67C2310	←	
12	TUBE ASSY	1	CWT01C622	CWT01C623	
13	DISCHARGE GRILLE COMPLETE	1	CWE20C629	←	
14	VANE COMPLETE (LEFT)	1	CWE24C113	←	
15	VANE COMPLETE (RIGHT)	1	CWE24C114	←	
16	MOTOR - AIR SWING (UP/DOWN)	1	CWA98260	←	O
17	LEAD WIRE - AIR SWING MOTOR (UP/DOWN)	1	CWA67C1814	←	
18	MOTOR - AIR SWING (RIGHT)	1	CWA98276	←	O
19	LEAD WIRE -AIR SWING MOTOR (RIGHT)	1	CWA67C2187	←	
20	MOTOR - AIR SWING (LEFT)	1	CWA98277	←	O
21	LEAD WIRE - AIR SWING MOTOR (LEFT)	1	CWA67C2188	←	
22	CAP COMPLETE	1	CWH52C003	←	
23	VANE	1	CWE24462A	←	
24	LEVER COMPLETE	2	CWH65C026	←	
25	RETAINING RING	2	XUC3	←	
26	PARTICULAR PIECE	1	CWD931019	←	
27	ELECRTONIC CONTROLLER	1	CWA741406	CWA741405	O
28	TERMINAL BOARD COMPLETE	1	CWA28C579	←	O
29	POWER SUPPLY CORD	1	CWA20C763	CWA20C764	
30	CONTROL BOARD COVER	1	CWH13463	←	
31	CONTROL BOARD COVER	1	CWH13465	←	
32	CONTROL BOARD COVER	1	CWH13466	←	
33	CONTROL BOARD COVER	1	CWH13464	←	
34	PARTICULAR PIECE	1	CWD931040	←	
35	INDICATOR HOLDER	1	CWD931018	←	
36	ELECTRONIC CONTROLLER (RECEIVER)	1	CWA74919	←	O
37	LEAD WIRE - RECEIVER	1	CWA67C2913	←	
38	INDICATOR COMPLETE	1	CWE39C299	←	O
39	LEAD WIRE - INDICATOR	1	CWA67C2912	←	
40	SENSOR COMPLETE	1	CWA50C613	←	O
41	HOLDER SENSOR	1	CWH32142	←	
42	REMOTE CONTROL SWITCH	1	CWA75C711	←	
43	FRONT GRILLE COMPLETE	1	CWE11C964	←	
44	INTAKE GRILLE COMPLETE	1	CWE22C333	←	
45	DECORATION BASE	1	CWE35C024	←	
46	TAB	2	CWD931020	←	
47	GRILLE DOOR COMPLETE	1	CWE14C103	←	
48	AIR FILTER	2	CWD00240	←	
49	CAP - FRONT GRILLE	2	CWH52267	←	
50	SCREW - FRONT GRILLE	2	XTN4+16C	←	
51	DRAIN HOSE	1	CWH5880580	←	
52	OPERATING INSTRUCTIONS	1	CWF561630	←	

Replacement Parts List

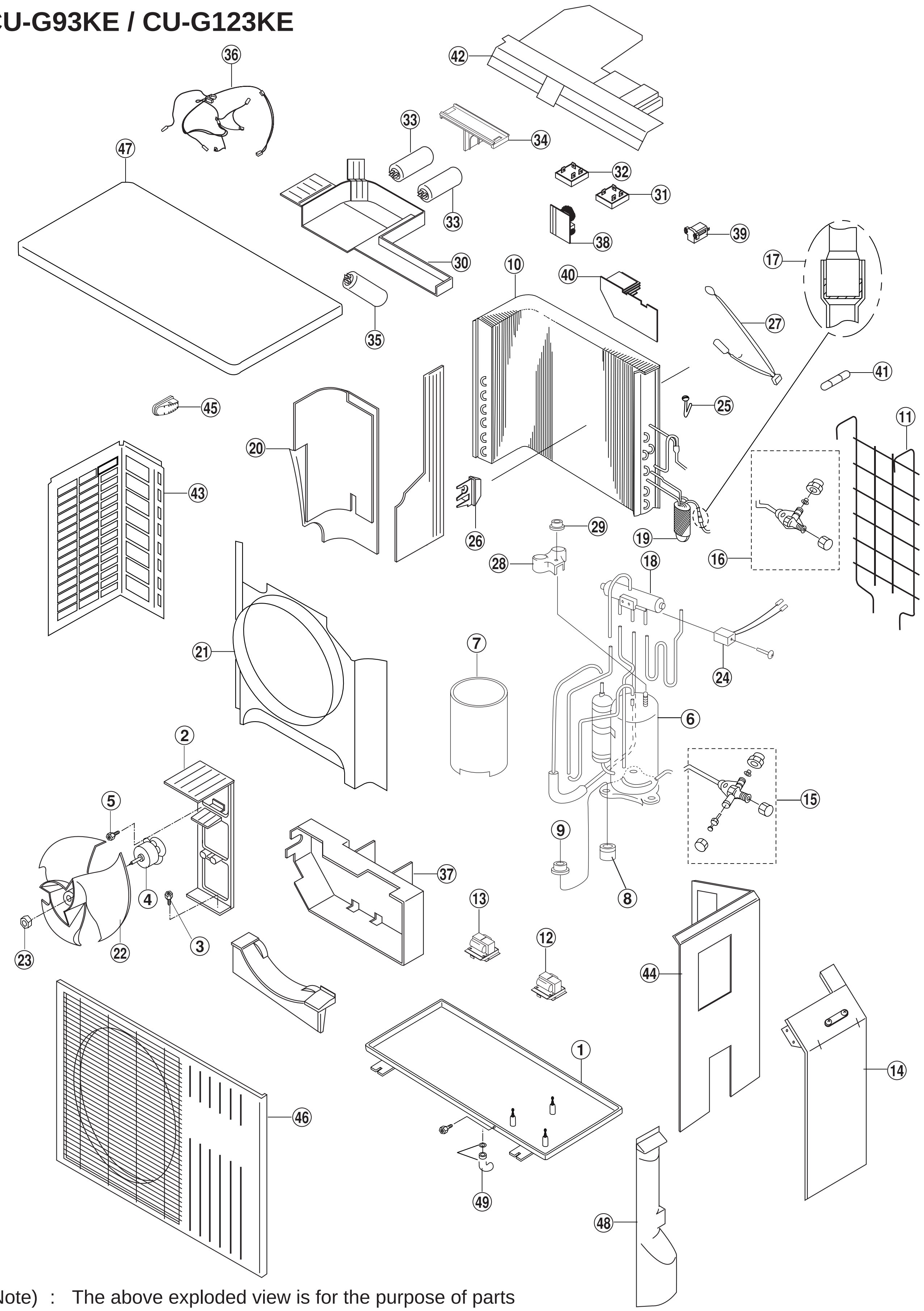
<Model: CS-G93KE / CS-G123KE>

NO.	DESCRIPTION & NAME	QTY	CS-G93KE	CS-G123KE	REMARKS
53	INSTALLATION INSTRUCTIONS	1	CWF61696	←	
54	INSTALLATION PLATE	1	CWH36157	←	
55	BAG COMPLETE (INSTALLATION SCREW)	1	CWH82C194	←	
56	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	←	
57	AIR PURIFYING FILTER	2	CWD00220	←	O
58	REMOTE CONTROL HOLDER	1	CWH36161	←	

(Note)
- All parts are supplied from MACC, Malaysia (Vendor Code: 086).
- ○ marked parts are recommended to be kept in stock.

Exploded View

CU-G93KE / CU-G123KE



(Note) : The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

Replacement Parts List

<Model: CU-G93KE / CU-G123KE>

NO.	DESCRIPTION & NAME	QTY	CU-G93KE	CU-G123KE	REMARKS
1	CHASSY COMPLETE	1	CWD50K660A	←	
2	FAN MOTOR BRACKET	1	CWD54254	CWD54255	
3	SCREW - FAN MOTOR BRACKET	10	-	←	
4	FAN MOTOR	1	CWA95384	CWA95380	O
5	SCREW - FAN MOTOR	4	CWH55406	←	
6	COMPRESSOR	1	2RD132X5BB03	2RD132X5BA03	O
7	SOUND PROOF MATERIAL	1	CWG30901	←	
8	ANTI VIBRATION BUSHING	3	CWH50183	←	
9	NUT	3	CWH56000	←	
10	CONDENSER	1	CWB32C350	CWB32C349	
11	WIRE NET	1	CWD04197A	CWD04198A	
12	REACTOR (RIGHT)	1	CWA42134	←	
13	REACTOR (LEFT)	1	CWA42135	←	
14	HOLDER COUPLING	1	CWH35177	←	
15	3 WAY VALVE	1	CWB01481	CWB01480	
16	2 WAY VALVE	1	CWB02308	←	
17	STRAINER	1	CWB11025	←	
18	4 WAY VALVE	1	CWB00002	CWB00003	
19	TUBE ASSY (CAPILLARY TUBE)	1	CWT01C668	CWT01C667	
20	SOUND PROOF BOARD	1	CWH15290	CWH15291	
21	AIR GUIDER PROPELLER FAN	1	CWD31C035	←	
22	PROPELLER FAN	1	CWH00K087	←	
23	NUT	1	CWH56053	←	
24	V COIL COMPLETE	1	CWA43C686	←	O
25	HOLDER SENSOR	1	CWH32074	←	
26	HOLDER SENSOR	1	CWH32082	←	
27	SENSOR COMPLETE	1	CWA50C614	←	O
28	TERMINAL COVER	1	CWH17006	←	
29	NUT	1	CWH7080300	←	
30	CONTROL BOARD	1	CWH10978	←	
31	DIODE BRIDGE 1	1	A54S25VB60	←	O
32	DIODE BRIDGE 2	1	A54D15VBA80	A54D25VB80	O
33	CAPACITOR	1/2	CWA30201(1)	CWA30200 (2)	O
34	HOLDER CAPACITOR	1	CWH30183	CWH30184	
35	SH CAPACITOR	1	CWA31137	←	O
36	LEAD WIRE COMPLETE (ZNR)	1	CWA67C2209	CWA67C2146	
37	CONTROL BOARD	1	CWH10979	←	
38	NOISE FILTER	1	CWA49C209	←	O
39	RESISTOR	1	CWA47038	←	O
40	ELECTRONIC CONTROLLER	1	CWA73C312	CWA73C311	O
41	FUSE	1	XBACW12	←	O
42	CONTROL BOARD COVER	1	CWH13C324	←	
43	CABINET SIDE PLATE	1	CWE04218A	←	
44	CABINET SIDE PLATE	1	CWE04217A	CWE04219A	
45	HANDLE	1	CWE16037C	←	
46	CABINET FRONT PLATE	1	CWE06K103A	←	
47	CABINET TOP PLATE	1	CWE03K036A	CWE03K037A	
48	CONTROL BOARD COVER	1	CWH13C325	←	
49	DRAIN ELBOW	1	CWH5850080	←	

(Note) • All parts are supplied from MACC, Malaysia (Vendor Code: 086).
• ○ marked parts are recommended to be kept in stock.

Electronic Parts List

<Model : CWA741405 / CWA741406> Indoor PCB

SYMBOL	DESCRIPTION & NAME	PART NO.
BZ1	BUZZER	A48040
D1, D2, D4, D5, D7, D8	DIODE	A541SS355T
D3, D6, D9	DIODE	A54D1F60
DB1	DIODE BRIDGE	A54D3SBA60F1
FUSE	FUSE	XBA2C31TR0
IC1	INTERGRATED CIRCUIT	A5278366F100
IC2	INTERGRATED CIRCUIT	A52BR9020F
IC3	INTERGRATED CIRCUIT	A52MPC393G22
IC4	INTERGRATED CIRCUIT	A52PST600DR
IC5, IC6	INTERGRATED CIRCUIT	A52A2003GR2
IC7, IC8	INTERGRATED CIRCUIT	A52C108
ICX	INTERGRATED CIRCUIT	A53715C (CWA741406) A53714C (CWA741405)
PC1	PHOTO COUPLER	A52S2501L1KC
PC2	PHOTO COUPLER	A52TLP371LF
PC3	PHOTO COUPLER	A52LP521L1BL
Q1, Q3, Q4, Q7, Q8, Q10	TRANSISTOR	A55DA143XKTX
SW1, SW2	SWITCH	A04085
SW3, SW4	SWITCH	A01059
T1	TRANSFORMER	A40C295
X1	RESONATOR	A45CTS4MG02T
ZNR1	ZNR	ERZVEAV511
ZNR2	ZNR	ERZVA9V271

Electronic Parts List

<Model : CWA73C312 / CWA73C311> Outdoor PCB

SYMBOL	DESCRIPTION & NAME	PART NO.
C-FM	CAPACITOR -FM	A31735
CT1	CURRENT TRANSFORMER	A40260
D1	DIODE	A54AU02ZV0
D17, D18, D20	DIODE	A54RA15-06V3
D19	DIODE	A54RA15-10V3
D2, D3, D4, D5, D8	DIODE	A54RA22-04V3
D6	DIODE	A541SS136T
D9 ~ D16	DIODE	A54MA165TA5
FUSE1, FUSE2	FUSE	XBA2C31TR0
IC1	INTERGRATED CIRCUIT	A5278214WP43
IC2	INTERGRATED CIRCUIT	A52MPA2003C
IC3	INTERGRATED CIRCUIT	A52C050
IC4	INTERGRATED CIRCUIT	A52M51951AST
IC5	INTERGRATED CIRCUIT	A52BX8454
IC6	INTERGRATED CIRCUIT	A52AN78L10TA
IC7	INTERGRATED CIRCUIT	A52AN79L10TA
IC8	INTERGRATED CIRCUIT	A52MPC339C
ICX	SERIAL PROM	A53716B (CWA741404) A53717A (CWA741408)
LED1	LED	A54SLR342DB7
PC1, PC3, PC12, PC13	PHOTO COUPLER	A52S2501-1PC
PC2	PHOTO COUPLER	A52LP521-3GB
PC4	PHOTO COUPLER	A52PS2633E
PC5	PHOTO COUPLER	A52S2501-1LC
PC6 ~ PC11	PHOTO COUPLER	A52LP521-1GH
Q1	TRANSISTOR	A55C070
Q4, Q6, Q7	TRANSISTOR	A55DTA143XST
Q5	TRANSISTOR	A55C1740STPQ
Q8	TRANSISTOR	A5520CVL33A
RY-FM	RELAY	A00161
RY-PWR	RELAY	A00106
SSR1	SSR	A56S26MD01M
T1	TRANSFORMER	A40367
VR1	VARISTOR	A44EVMEASB22
VR2	VARISTOR	A44VMEASB13
X1	RESONATOR	A45ST12MTWOT
ZD1	ZENAR DIODE	A54D6.2EB1TB
ZNR1	ZNR	ERZVA9V271

ELECTRONIC CIRCUIT DIAGRAM <INDOOR UNIT>

- CS-G93KE
- CS-G123KE

FAN MOTOR

BETWEEN COILS	RESISTANCE AT 20°C (Ω)	VOLTAGE AC (V)
① & ②	6.1	21 (23)
① & ③	6.1	21 (23)
② & ③	6.1	21 (23)

How to use electronic circuit diagram

Before using the circuit diagram, read the following carefully.

* Voltage measurement
Voltage has been measured with a digital tester at rated frequency.
Use them for servicing.
Voltage indication is in Red at cooling and all operations.
Voltage indication is in (Red) at heating.

* Indications for resistance
a. K.... kΩ M ... MΩ
W... watt Not indicated 1/4W
b. Type
Not indicated .... carbon resister Tolerance±5%
.... metal oxide resister Tolerance±1%

* Indications for capacitor
a. Unit μ .... μF P .... pF
b. Type Not indicated ... ceramic capacitor
(S) .... S series aluminium electrolytic capacitor
(Z) .... Z series aluminium electrolytic capacitor
(SU) .... SU series aluminium electrolytic capacitor
(P) .... P series polyester system
(SXE) ..... SXE series aluminium electrolytic capacitor
(SRA)...... SRA series aluminium electrolytic capacitor
(KME)......KME series aluminium electrolytic capacitor

* Diode without indication MA165
※ Circuit Diagram is subject to change without notice for further development.

TIMER TABLE <INDOOR>

Name	Time	Test mode When test point short-circuited
4 way valve abnormality	4 min.	2.4 sec.
Outdoor air temp. for Hz No. decision	30 min.	0 sec.
Anti-dew formation control	20 min.	0 sec.
Anti-freezing control	6 min.	0 sec.
Thermo OFF delay	3 min.	0 sec.
Low pressure control (gas leakage) compressor OFF time	3 min.	0 sec.
Time delay safety control	2 min. 58 sec.	0 sec.
Odour timer status shift time	30 sec.	0 sec.
	60 sec.	
Intake air temp. sampling time	2 min.	0 sec.
Self diagnosis display time	10 sec.	0 sec.
Auto mode judgement sampling time	20 sec.	0 sec.
24 hours ON / OFF timer		1 hour → 1 min.
Heating SSHi fan speed shift	120 min.	12 sec.
Cooling SHi fan speed shift	30 min.	3 sec.
Hot start forced completion	4 min.	0 sec.
Anti-fog discharge control	30 min.	3 sec.
	90 min.	9 sec.
	180 min.	18 sec.
	420 min.	42 sec.
Auto mode judgement interval	30 min.	3 sec.
Sleep mode time shift		1 hour → 6 sec.
After Hot start / Deice	2 min.	12 sec.

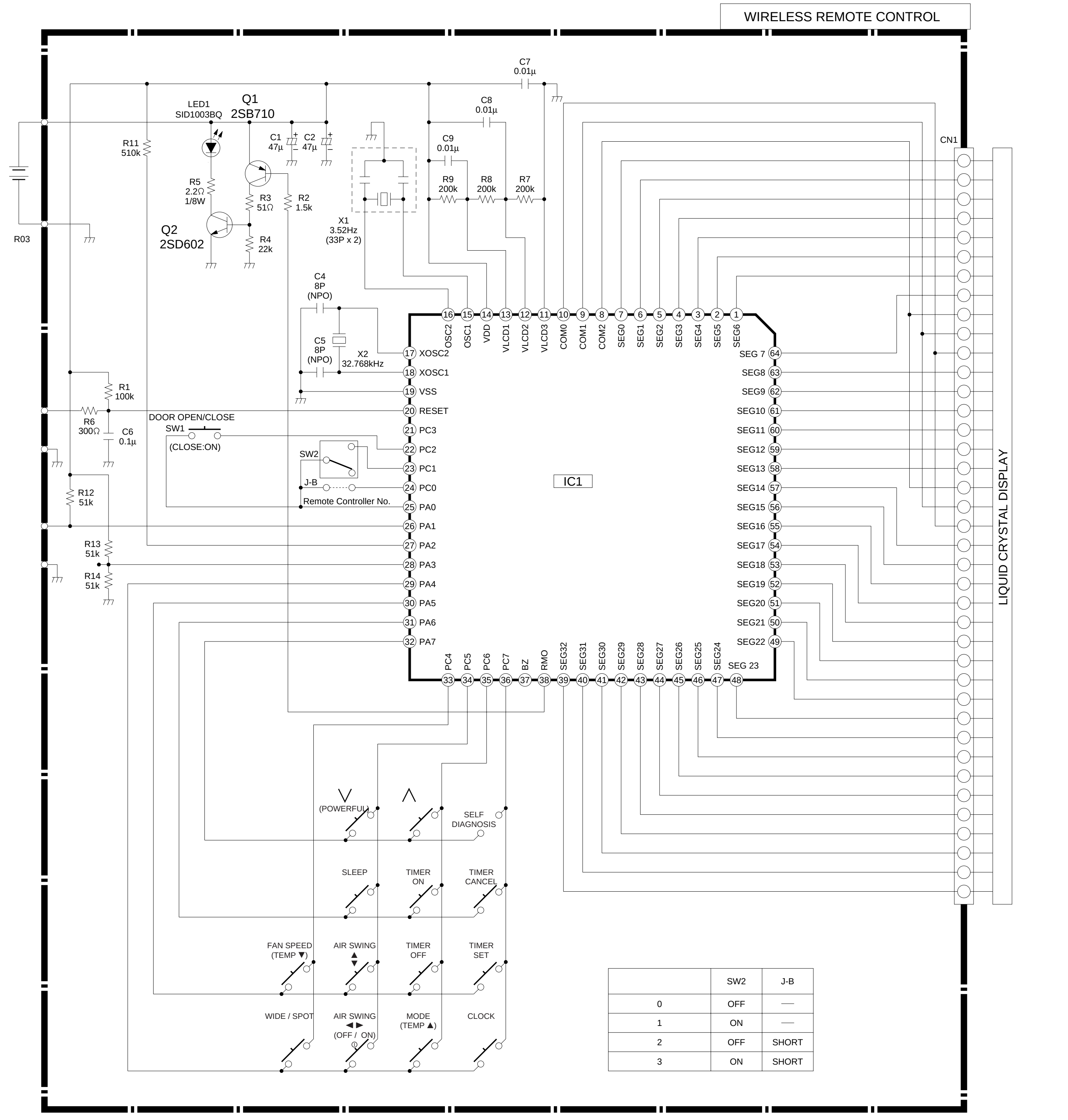
CS-G93K/G123K CS-G93K/G123K

TIMER TABLE <OUTDOOR>

Name	Time	Test mode When test point short-circuited
DC PEAK	30 sec.	3 sec.
Deice detection	120 min.	24 sec.
	80 min.	16 sec.
	40 min.	8 sec.
	40 min.	8 sec.
Deice forced completion	11 min.	66 sec.
Hz lock time	30 sec.	0 sec.
Outdoor fan delay operation control	30 sec.	3 sec.
4 way valve delay operation control	3 min.	18 sec.

ELECTRONIC CIRCUIT DIAGRAM

● REMOTE CONTROL



ELECTRONIC CIRCUIT DIAGRAM <OUTDOOR UNIT>

- CU-G93KE
- CU-G123KE

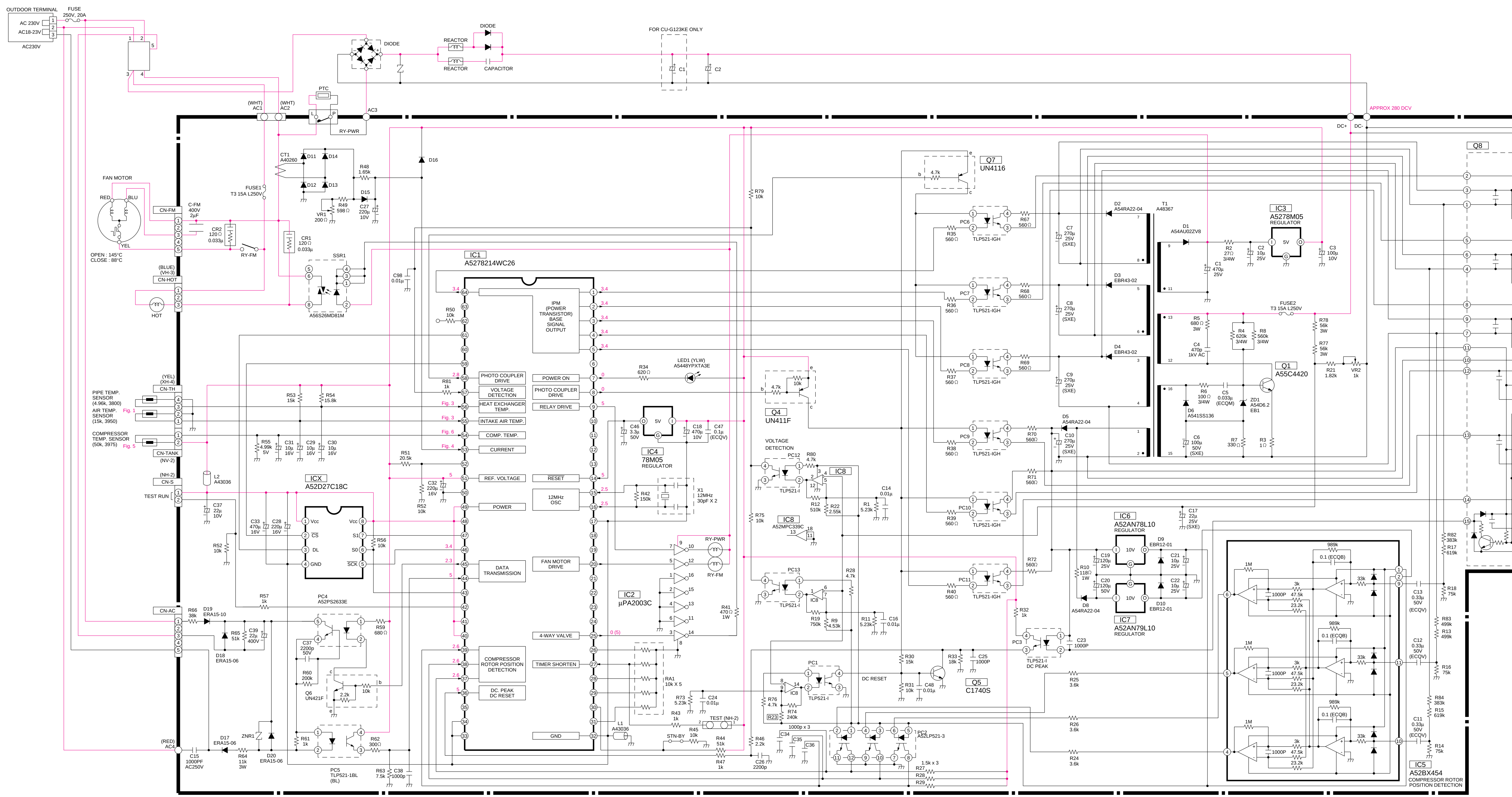
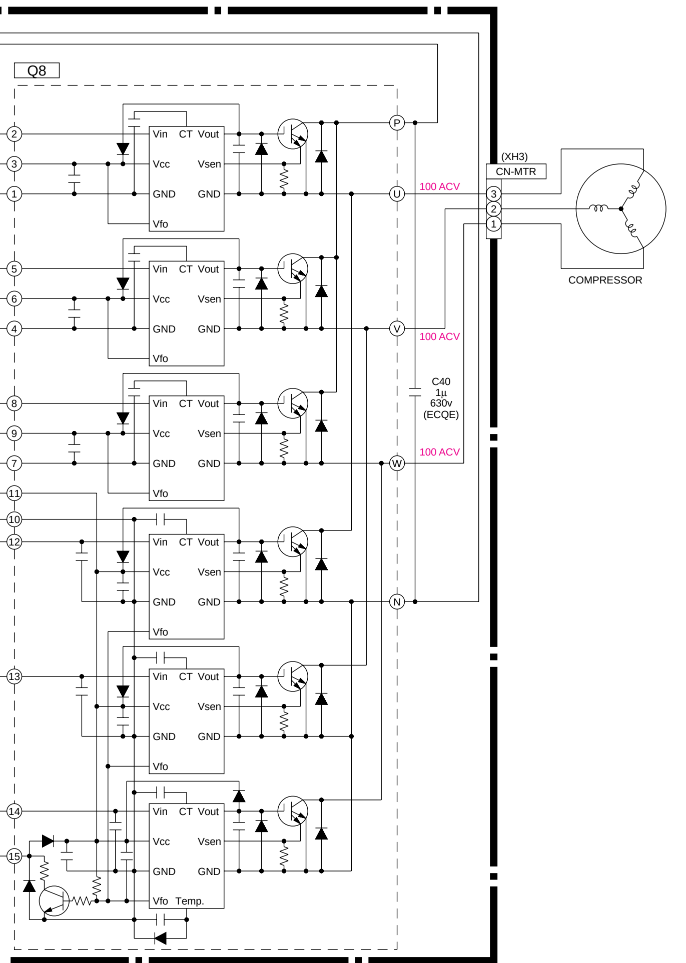



Fig. 3

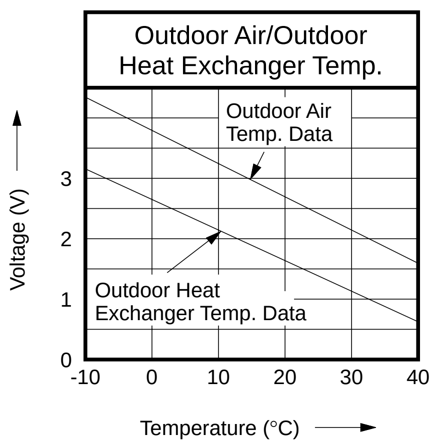


Fig. 4

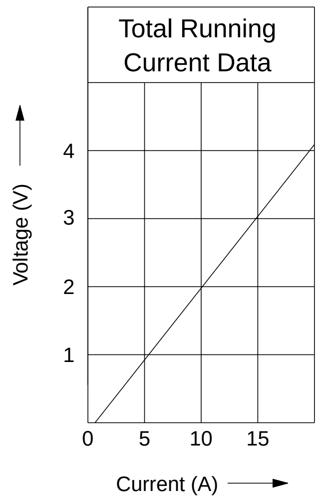


Fig. 5

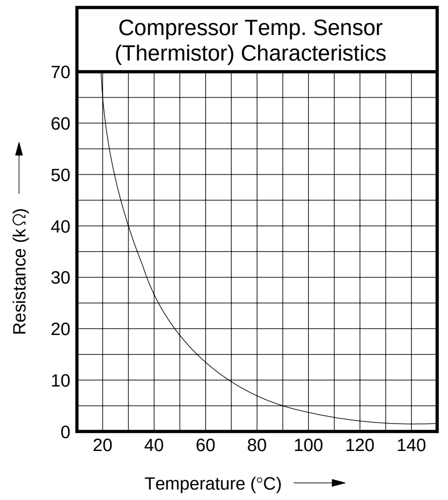
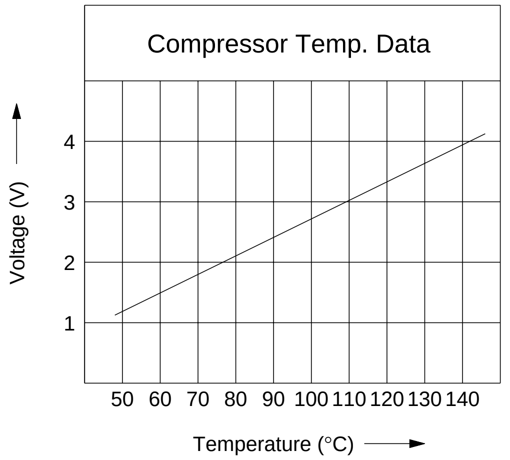


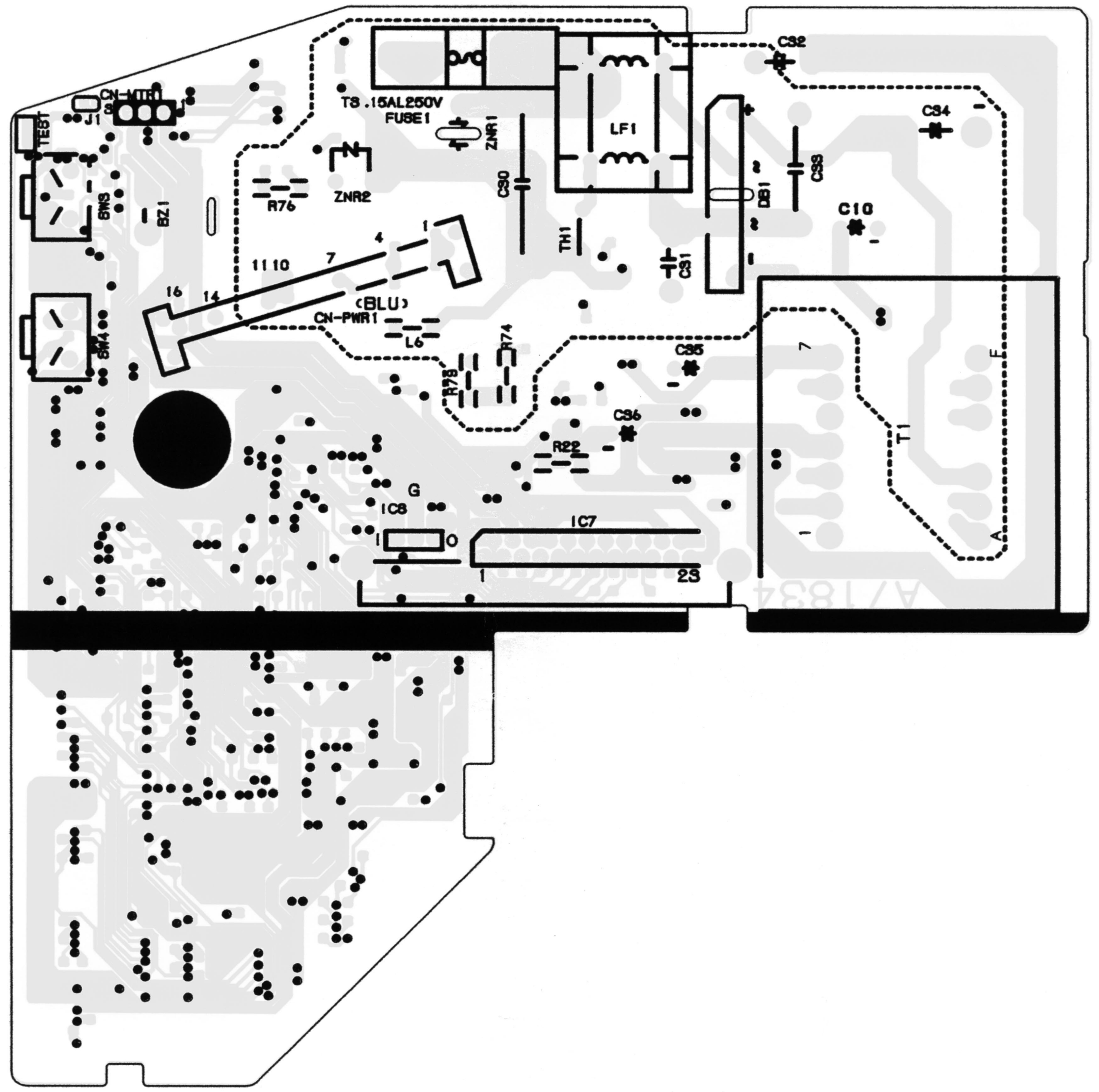
Fig. 5



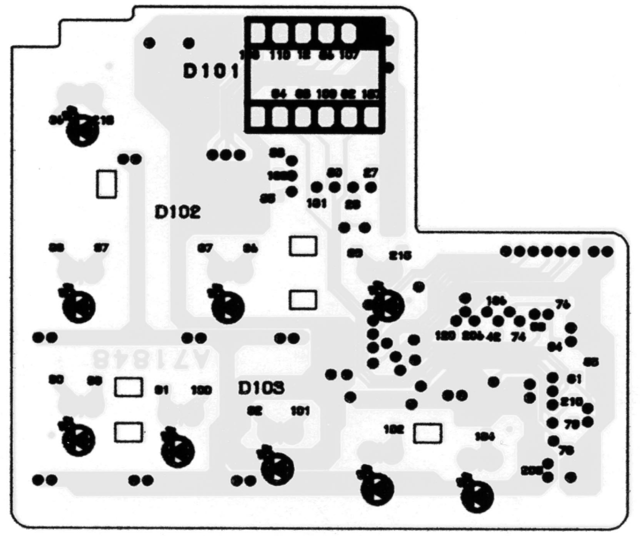
PRINT PATTERN

INDOOR UNIT PRINTED CIRCUIT BOARD

● MAIN

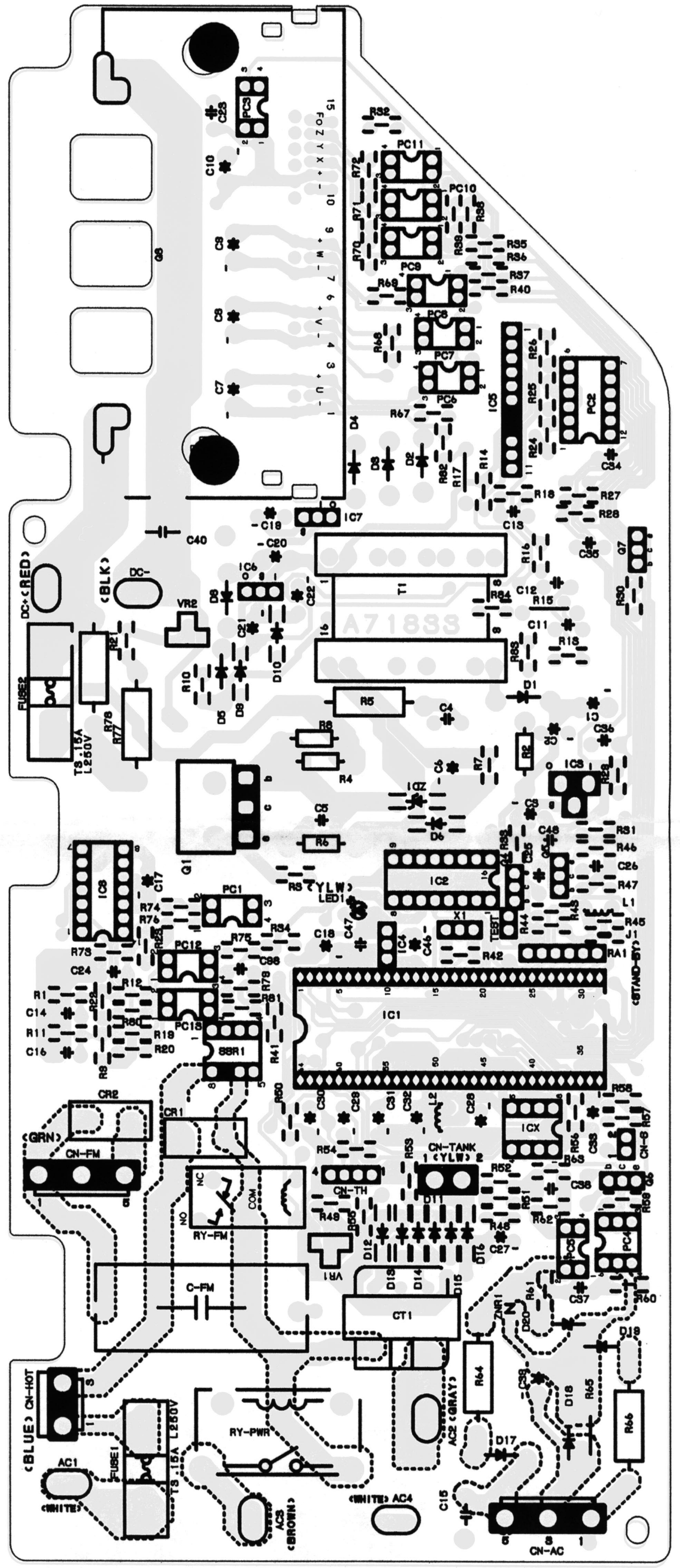


● INDICATOR



OUTDOOR UNIT PRINTED CIRCUIT BOARD

● MAIN



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